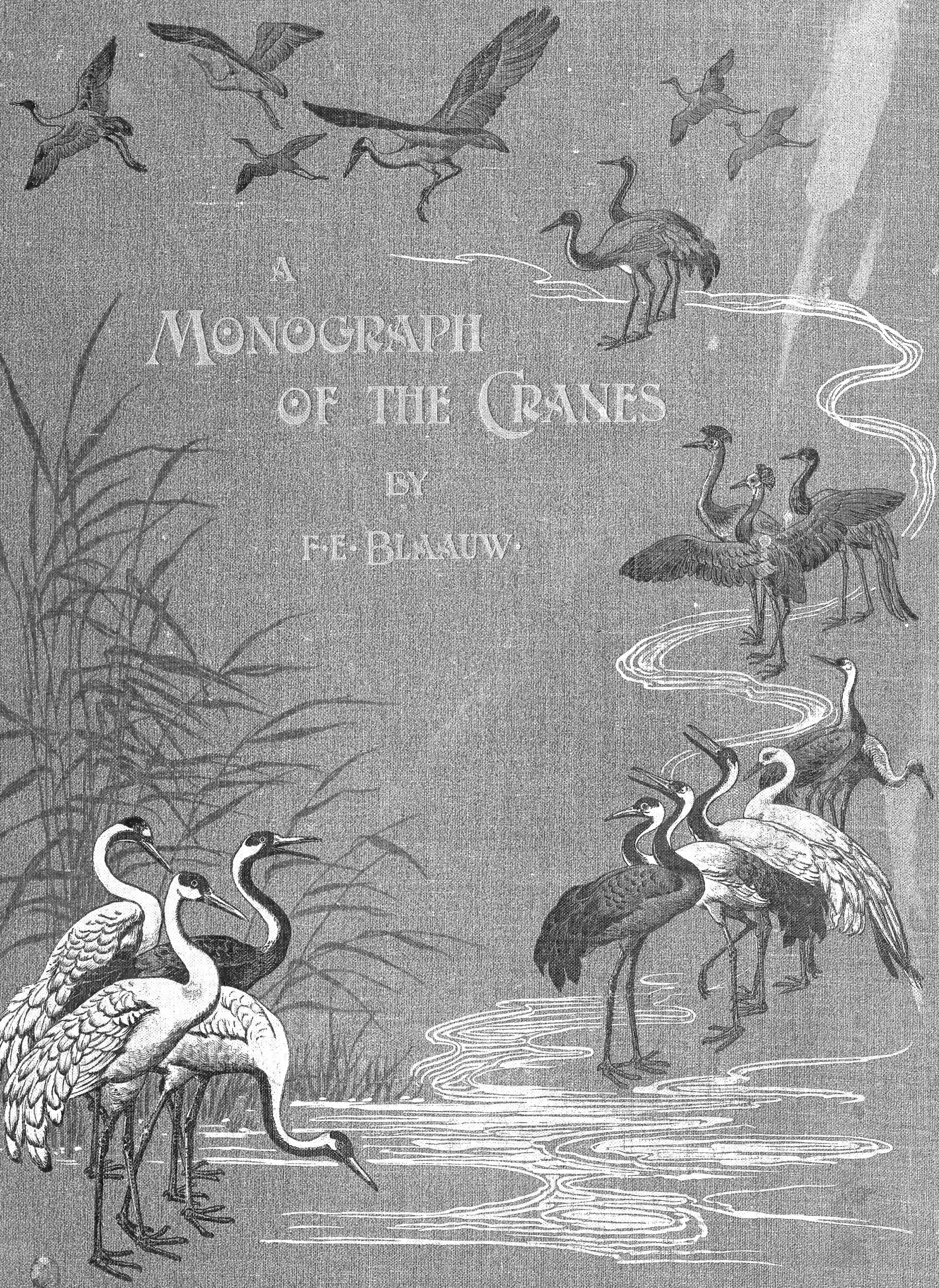
A MONOGRAPH OF THE CRANES

BY

F. E. BLAAUW.



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BY

F. E. BLAAUW,

Corresponding Member of the Zoological Society of London; Member of the British Ornithologists Union.
Délégué de la Société nationale d'acclimation de France.

Illustrated by 22 Coloured Plates (the greater number drawn under the immediate superintendence of the late Dr. G. F. WESTERMAN) by HEINRICH LEUTEMANN and J. G. KEULEMANS.

LEIDEN AND LONDON:

E. J. BRILL,
(OUDE RIJN, 33*a*).

R. H. PORTER,
(18, PRINCES STREET, CAVENDISH SQUARE, W.).

1897.

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PREFACE.

The chief object of the present work is to introduce to the public a beautiful series of water-colour drawings, taken from birds living in the Zoological Garden of Amsterdam in the year 1872. These drawings were made by the well-known German artist, Heinrich Leutemann, under the direct supervision of the late Dr. G. F. Westerman, Director and Founder of the Zoological Society of Amsterdam. The Cranes were always special favourites of Westerman's, and amongst the birds which the Amsterdam Garden exhibited during his Directorship, the series of Cranes was usually as nearly as possible complete. They were always kept in the most perfect condition by their faithful keeper Jan Peels. Leutemann's drawings, which included figures of fifteen species, all of which had been taken from life, except that of *Grus monachus* which has never been exhibited alive in Amsterdam, were carefully preserved by Westerman, and only occasionally shown to a select few of his friends.

A few months before his death Westerman came to talk to me about these drawings, saying it had always been his wish to publish them along with a complete history of the Cranes, but that he had never been able to execute this plan. He told me of his intention to leave me the drawings at his death, and expressed his desire that I should accomplish what he had failed to do. On the 9th of May 1890 Westerman died, and the drawings came into my possession. My first object in publishing the present work is, accordingly, to fulfil the last wishes of my old and much valued friend. As fifteen species only had been drawn by Leutemann, I have completed the series by a figure of *Grus nigricollis*, from a specimen kindly lent to me for that purpose by Dr. Strauch, the lately deceased Director of the Museum of the Académie Royale des Sciences of St. Petersburg. I have also thought it would be interesting to figure young Cranes of different species in down, and in immature dress, and the eggs of such of those that I could get access to. These additional plates have all been executed by Mr. Keulemans who has likewise drawn the whole of the plates on the stones.

For assisting me in various ways in the accomplishment of this work I wish hereby to express my best thanks to Dr. P. L. Sclater, Secretary of the Zoological Society of London, to Dr. Jentink, Director of the Natural History Museum of Leiden, to Dr. Bowdler Sharpe of the British Museum, to Dr. Oustalet of the Muséum d'Histoire Naturelle of Paris, to Dr. Reichenow of the Berlin Natural History Museum, to the Académie Royale des Sciences of St. Petersburg, and to many other persons and Institutions who have given me most kind aid and advice.

's GRAVELAND, June 1896.

F. E. BLAAUW.

INTRODUCTION.

It does not seem necessary, in the present work to enter into the question of the correct systematic position of the Crane-family, or to describe the details of their structure. It will suffice to say that I agree with the views of those authorities who place the *Gruidæ* as a family of the order of *Alectorides*, between the *Rhinochetidæ* on the one hand and the *Psophiidæ* on the other. But although I agree with Dr. Bowdler Sharpe and other Systematists in adopting this position for the *Gruidæ*, I cannot but think that that author, to whom we are indebted for the latest revision of the group (contained in the twenty-third volume of the Catalogue of Birds in the British Museum) has needlessly augmented the number of genera of this family.

After a careful examination of the external characters of the Cranes, and a study of a very material feature in their anatomy, namely, the form of the trachea, I have come to the conclusion that it is quite unnecessary to employ more than three generic terms for the birds of this family — namely *Grus*, *Anthropoides*, and *Balearica*.

As regards the species of Cranes, of which Dr. Sharpe recognizes nineteen, I am only able to satisfy myself, after examination of all the available material, of the existence of sixteen distinct specific forms. I am quite unable, as will be shown in the text relating to the several species, to separate *Grus lilfordi* from *Grus communis*, *Grus mexicana* from *Grus canadensis*, and *Balearica gibbericeps* from *Balearica regulorum*. Striking out then three species from Dr. Sharpe's list aud reducing the number of genera to three I propose to arrange the members of this family as follows.

a. Grus.

Trachea very much convoluted, making several folds which enter into the greater part (sometimes into the farthest extremity) of the keel of the sternum. These folds are most developed in *Grus cinerea*, *G. nigricollis?*, *G. japonensis*, *G. americana* and *G. monachus*, less so in *G. canadensis*, *G. antigone*, *G. collaris* and *G. australasiana*.

Whole *crown of head* bare in all the species, the bare space not extending lower than the upper eyelid in the five first-named species. This bare space is more developped in *G. canadensis*, and extends over the whole of the head in *G. australasiana*, which also deviates from its allies in having a gular pouch. In *G. antigone* and *G. collaris* the bare skin of the head includes the upper part of the neck, and in one species (*G. americana*) the lower cheeks are not covered with feathers but with black hairs.

Inner secondaries falcated and pointed and partially decomposed in the first five named species, not decomposed in the last four.

General plumage grey or white.

Bill longer than the head, nostrils linear.

LIST OF SPECIES OF GRUS.

		Page.	Plate.
1.	Grus communis.	1	I.
2.	„ nigricollis.	9	II.
3.	„ japonensis	11	III.
4.	„ monachus.	15	IV.
5.	„ americana.	17	V.
6.	„ canadensis	21	VI.
7.	„ collaris.	25	VII, VIIa.
8.	„ antigone	29	VIII.
9.	„ australasiana.	33	IX.

b. Anthropoides.

Trachea not entering into the keel of the sternum, but only extending partially into a depression of it before bending round the *mons interclavicularis*, and then entering into the lungs. I have unfortunately not been able to examine a sternum and trachea undoubtedly belonging to *Anthropoides leucauchen*, but I have little doubt it will be found to agree with the other allied species, and as in the external characters it agrees with the other members of the genus, I have not hesitated to put it in the genus *Anthropoides*.

Hinder part of crown of head always feathered.

Bill longer than the head or of the same length. Nostrils linear.

The head is completely feathered and adorned with lengthened feathers in *A. virgo* and *A. paradisea*. In *A. carunculata* it is also feathered, but has the base of the bill covered with granulations or fleshy threads; besides which in this species a partially feathered lappet hangs down on each side of the throat.

In *A. leucogeranus* the forehead is naked up to above the eyes, while in *A. leucauchen* the sides of the face above and beneath the eyes are bare, the feathers of the head extending over the crown into a triangle down to a level with the eyes.

Inner secondaries enormously lengthened and pointed in *A. paradisea*, *A. carunculata* and *A. virgo*, less so in *A. leucauchen* and only falcated in *A. leucogeranus*.

Lower throat feathers lengthened or loose in *A. virgo*, *A. paradisea* and *A. carunculata*.

LIST OF SPECIES OF ANTHROPOIDES.

		Page.	Plate.
1. Anthropoides	virgo	35	X, Xa.
2. „	paradisea	41	XI, XIa.
3. „	carunculata	45	XII.
4. „	leucauchen	49	XIII.
5. „	leucogeranus	53	XIV.

c. Balearica.

Trachea going straight into the lungs without convolutions, and not entering into the keel of the sternum.

Cheeks bare. Bill rather shorter than the head. Nostrils oblique.

Head ornamented with a tuft of straw-like bristles on the nape.

Inner secondaries broadened and slightly decomposed.

Inner greater wing-coverts straw-coloured and disintegrated.

Feathers on the lower throat lengthened and pointed.

Throat naked for the greater part in *B. pavonina*, besides which it has a gular wattle in *B. regulorum*.

LIST OF SPECIES OF BALEARICA.

		Page.	Plate.
1. Balearica	pavonina	57	XV, XVa.
2. „	regulorum	61	XVI.

Cranes moult only once a year, but as the moult occurs at two periods, the wing- and tail-feathers being dropped at one time and the body-feathers at another, it has sometimes been supposed erroneously that these birds have two moults in the year. Most Cranes in captivity, and this agrees with observations made on some of the species in a wild state, moult all the primaries and part of the secondaries at once, so that the birds for a time are unable to fly. I have observed this duck-like moult in *Grus japonensis*, *G. communis*, *G. americana*, *Anthropoides leucogeranus* and *A. paradisea*, and Lord Lilford has noticed the same thing in the first, fourth and fifth species above-named, and besides these in *Grus collaris* and *Anthropoides leucauchen*. That this is not an abnormal way of moulting caused by captivity, as might perhaps be conjectured, is proved by what has been observed in some of the species in a wild state. Thus, for instance, Mr. Charles Reiche of Alfeld, who yearly imports many specimens of *Anthropoides paradisea*, informs me that these birds are captured during the moult when they are unable to fly. The birds are simply surrounded, when in some accessible part of the country, and driven into an enclosure. The Common Crane of Europe in a *wild state* is also unable to fly during the moult. The wing-feathers once shed, grow again very rapidly and the birds soon recover the power of flight. This moult, as I have observed in captive specimens of *Grus japonensis*, and about which I have obtained trustworthy information in the case of *Grus communis* in a state of nature, occurs a few weeks after the young ones are hatched, and, as at that time the birds usually live with their offspring in very secluded and swampy places, they probably

seldom suffer much inconvenience from this temporary inability to fly. In my captive pair of *Grus japonensis*, the birds shed their primaries every other year only, but whether this is peculiar to the individual pair of birds or is a rule with the whole species I am unable to say.

The immature dress of the Cranes — that is the first feathering that the young birds put on — is quite different from that of the adults. It differs usually, not only as regards the coloration, but also in its not having those feathers abnormally developed which become so in the mature birds. These ornamental feathers, however, may always be known in the young stage by their having some special form. Except in two species (*Anthropoides virgo* and *A. paradisea*) or perhaps three (as I am inclined to think that *A. carunculata* also shares in this peculiarity) all the Cranes are more or less brown in the immature dress, and I have observed that the whiter the dress of the adult the browner is that of the young. So for instance the young of *G. americana* and *A. leucogeranus* are almost wholly cinnamon brown, whilst the young of *G. collaris* and *G. canadensis* are grey, with brown edgings to the feathers only. This immature dress begins gradually to disappear during the first winter by the wearing away of the brown edges of the feathers, and also by a slow moult, and in the course of the second summer (that is when the young birds are more than a year old) gives place to the adult plumage. At the same time the naked parts begin to appear, but it takes more than a year for these parts to assume their full coloration and extent. This has been observed by Radde in *Grus monachus* in a wild state and by me in *Grus japonensis* and *G. communis* in captivity.

Cranes have no distinct winter and summer plumages, the only differences observable being that in the breeding-season the fleshy ornaments are more highly coloured and all the ornamental plumes are a little more conspicuous. This is probably from the wearing away of the more or less diffusely coloured edges which the newly grown feathers usually present.

The Cranes present scarcely any outward difference in the sexes. The feathering is exactly the same, but the male is usually larger than its mate and the naked parts are generally a little more conspicuous.

Cranes lay *two* eggs as a rule. The crowned cranes, the sarus crane and the Stanley crane however, have been observed to lay occasionally *three* at a time. Young birds, or birds that have been disturbed and have laid a second clutch, usually lay *one* egg only.

THE COMMON CRANE.

I.

THE COMMON CRANE

GRUS COMMUNIS

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Vernacular names. The Common Crane (English); de Kraanvogel (Dutch); la Grue Cendrée (French); der graue Kranich (German); Kurotsuru (Japanese).

Adult. General colour above ashy grey, sometimes darker, sometimes lighter, so as to be almost pearl grey. The grey usually slightly shaded with ashy brown on the back. Underside clearer grey without brownish. — Primaries and their coverts, outer secondaries, and greater part of the tailfeathers blackish. Innermost secondaries and their large coverts falcated, the secondaries also partially decomposed and erectable. Colour light grey with black tips, or dark grey with idem, or sometimes, but more rarely so, of a nearly uniform slaty black. Forehead and crown of head devoid of feathers. Skin black on forehead and further crown, and covered with black hairs. Skin of hinder crown red and granulated. Rest of head and neck dark slate colour, a white band of about half an inch wide beginning behind each eye runs downward along the neck, meeting behind in the lower part of it.

Bill greenish, pink at the base, iris yellow, leggs greyish horn colour. (Living bird Amsterdam Zoological Garden).

Wing 23 inches, tail 8 inches, tarsus 10 inches, middle toe & claw 4 inches, culmen 4¼ inches [bird in the Leiden Museum].

Immature. Similar to the adult but all the feathers, especially those of the upperparts, with brown margins. — Head entirely feathered. Parts which afterwards become naked, as well as those which in the adult stage have white feathers, most conspicuously cinnamon brown. — Inner secondaries not decomposed or erectible but slightly falcated. — Legs blackish horn colour.

Chick. Yellowish buff down, rich chestnut on the back.

Egg. Figured on plate XVII, N°. 1, of the natural size, from a specimen in the Leyden Museum.

Hab. The greater part of Europe and Asia breeding chiefly in the southern part of the northern half of those continents; the European birds wintering in North Africa and along the valley of the Nile, the Asiatic birds in Northern India and the Yangtse basin.

The Common Crane varies a little in the general colouring, and especially so in that of the ornamental inner secondaries, which, although usually pearl grey with black tops, are sometimes of a nearly uniform smoky black, whilst intermediate forms occur. Birds thus darkly coloured are, however, to be regarded as varieties only. I have not been able to find the slightest differences between normally coloured birds from Western Europe (for instance Hanover and Boitzenburg on the Elbe) and those from the extreme east of Asia. Dr. Bowdler Sharpe in his Catalogue of Birds in the British Museum' has separated the Common Crane of Europe from that of Asia, giving the Asiatic bird the name of *Grus lilfordi*. He founds this division on the unfortunate fact that the few adult European Cranes of this species in the British Museum happen to belong to those birds which have exceptionally darkish tertiaries, whilst the numerous skins of Asiatic Cranes are all normally coloured.

If the British Museum had a larger series of European Cranes than unfortunately is the case at present, it would have been evident that the usual form of this bird, even in the most western part of its distribution, is perfectly indistinguishable from that of Asia. For instance I have found birds in the Leiden Museum from Germany and from Finland (N^os^. 1 and 3 of the „Catalogue"), birds in the Hamburg Museum (from the neighbourhood of that town),

birds from St. Gilles, in the Camargue, in the Paris Museum and birds in other continental and English collections, which are not a shade darker than or different from the Asiatic birds. The extent of the naked skin crossing the vertex has been said to be narrower in Asiatic birds than in European ones. I cannot agree to this distinction, as even in living birds the extent of naked skin varies continually, not only according to the season, but even according to the frame of mind of the individuals. As a rule the naked skin is more visible, more extended, and more intensely coloured in the breeding season than in winter, but even in spring a very great difference in its extent may be noticed between a calm unexcited bird and one that is „showing off" or angry.

Nearly all the Asiatic skins of the Common Crane in the British Museum are from birds killed in India, where they resort in winter, so that there is a good chance that the extent of the bare skin (so far as can be judged of naked parts in dry skins) should be at a minimum. I am, therefore, convinced that the attempt to distinguish the European and Asiatic Cranes as *Grus communis* and *Grus lilfordi* has no ground to rest upon and ought to be abandoned.

The Common Crane has a wide distribution and extends over three continents: Europe, Asia, and the northern half of Africa, in most parts of which either as a migrant, a summer- or a winter-visitor, it is a common bird. In Europe it extended in former days much more to the west than it does now, and Turner (in his „Avium praecipuarum quarum apud Plinium et Aristotelem mentis est, brevis et succincta historia ....". Coloniae 1544) mentions the breeding of it in England as quite a usual thing, and states that he had often seen the chicks. The place of nidification was probably, as has been suggested by Prof. Alfred Newton of Cambridge, the fen-districts of that county, as Crane's bones have occasionally been dug up there, and some specimens are preserved in the Cambridge Museum. In Ireland remains of this Crane have been found in the Kitchen-middens of Ballycotton, Co. Cork [1]), so that it must have been indigenous in that country also. The breeding of Cranes in England is, however, quite a thing of the past now, and even so far back as 1682 the Crane is spoken of by Sir T. Browne (Newton & Gadow Diction. of Birds, p. 109) as a winter visitor only in the open parts of Norfolk. No trustworthy account of its breeding in the British Islands has been given ever since, and it must now be considered there as a rare straggler from Sweden or Western Germany.

In Holland the Crane *may* have bred in former days, but no account of its having done so is given anywhere, so far as I know. At the present time it is an irregular visitor. during migration, generally passing over, and very seldom alighting in the marshy heathery districts of North Brabant.

More to the east of Europe the Crane breeds in suitable localities, that is in swampy plains interspersed with thin woods and bushes. It is found in Scandinavia, and more to the south, from the 10 th. meridian eastwards, in some parts of Hanover, in Mecklenburg, in the neighbourhood of Cresse near Boitzenburg on the Elbe (from which locality there are young chicks, taken on the 3rd. June 1890, in the Hamburg Museum), in Brandenburg, around the Baltic, in Silesia, along the Danube, and in Russia, and eastwards locally all over the northern half of Asia. Taczanowski records its breeding regularly in the Darusun country in Transbaikalia. Finsch, during the Bremen expedition to Western Siberia, saw it frequently in July along the river Ob and on lake Ala-kul. Seebohm found it in the Valley of the Yenesay, but not northwards of 60° N. L. Severtzoff records it as breeding in the cultivated districts and woods of Turkestan. Demidoff found it breeding in Podolia, Volhynia, and Bessarabia. Stejneger records the probability of its having occurred in Behring Island, and Steller says it has been observed in Kamtschatka. Radde records its breeding in the Caucasus, on the Goktschai Lake, and in the Gilli marshes, also on the eastern slopes of the Kanly mountains, on the verge of the Ardahan plain, and as being very numerous in the Marschau swamps. It does not breed in the hot plains to the north of the Great Caucasus but is found again in the highlands of Armenia.

Besides the countries just mentioned the Common Crane breeds in some localities in Southern Europe, but this must be regarded as rather exceptional. Thus for instance Prof. Giglioli (Ibis, 1881, p. 212) mentions the yearly breeding of a few pairs in the extensive marshes along the Adriatic, north of Venice. Wyatt has recorded its nesting in Macedonia, and Saunders found it breeding tolerably plentifully in the Donnana marshes in Andalucia, Southern Spain.

It is not very long ago that comparatively little was known to ornithologists in general about the reproduction of the Crane. The Germans, of course, knew more about it than the more western naturalists, but even Naumann and Brehm are rather vague about details concerning the behaviour of the chicks and their parents. In 1859 Mr. J. Wolley gave in „The Ibis" an excellent account of the breeding of the Crane in Lapland where he succeeded in finding eggs and chicks.

I may as well give my own experience of the breeding of this species in Hanover in the spring of 1895. On the 23rd of May I received a letter from Hanover to inform me that a pair of Cranes were nesting not very far from that town, and on the 24th. I was on the way to the old German Capital, where I arrived in the course of the evening just in time to get the necessary information for the proposed trip on the following day. Accordingly I set out next

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1) Lydekker, Ibis, 1891, p. 393.

morning in a carriage to a village in which I hoped to find my guide. The drive was rather a long one, as it took me more than two hours and a half to reach the place of destination. On the road several villages were passed and the surrounding country, which was almost flat, consisted of one large field of rye. Once arrived I expected some difficulty in finding my guide, but at the first inquiry I got a satisfactory answer, and was told to call at the last house of the place which was the poorhouse. This last house of the village was not difficult to find and alighting from my carriage I soon found a door, which, however, was locked, and some windows, that were shut also, and as there was no bell I was just thinking where my knocking would be most effective, when suddenly, from some hitherto unseen aperture in the wall, a neat little lady emerged, curtseying and enquiring, whether I was the gentleman from Holland. Having satisfied her on this point she showed me in, and putting her head through a door, which stood ajar, into some other room apprised her lord and master that the visitor had come. After a while the man appeared, something between a rogue and a vagabond (very much of both) with whitish beard and hair and attired in, as he afterwards did me the honour to tell me, a homespun blue linen pair of trousers and a jacket of the same material, and a pair of wonderful wooden slippers. After I had made sure, as far as possible, that he really knew the abode of a breeding pair of Cranes, I got his promise to bring me there if I did not mind a rather long walk on a bad road or no road at all. This being no difficulty, his lady provided him with two slices of bread and some cheese, and wished us good speed, and so we departed. For some distance the road went uphill and was very dusty and the country looked very „un-cranelike", but after having reached the top we rapidly came down again on the other side and got to an extent of swampy meadows with pine forests in the background. To these forests we were bound, and as we came near them the ground got a little dryer, and a roedeer was seen feeding in the meadows that touched the forest, and quietly trotted away at our approach. On the way I noticed that the frogs, which abounded in countless numbers in the water all round, had wonderfully bright yellow heads, so much so that when in the water with the head just peeping out of it, after frog-fashion, they were difficult to distinguish from the yellow flowers of the aquatic plants.

Our way now led through the pine forest, and having passed through it, we turned to the left, following in Indian file, my guide and myself, along a narrow footpath bordering it, whilst at our right a tract of swampy heath interspersed with clumps of pine trees extended as far as I could see. After having gone on for a considerable time, disturbing a roedeer now and then, my guide halted and took off his stockings, and turning up his blue trousers a little way, turned to the right straight through the bog, the wooden slippers and naked feet making a splash all the time.

After we had traversed more swamp and more pine-forest my guide halted again, and this time turned up his trousers as far as he could, although it seemed to me they would have been all the better for a good wash, and put his slippers into his pocket. We now had before us a big extent of water, which, in some parts, reached over my knees as we went through it. In the deepest part of it was a clump of trees, twenty or thirty in number, standing on slightly elevated ground, so that the foot of each tree was more or less out of the water. Near one of them was a little islet of some five feet long and four feet wide, and on this islet was what the Cranes consider a nest; that is a little mat of dry grass of about an inch high, two feet long and a little less wide, and perfectly flat. In the nest, or better on it, were some fragments of shells and a complete half shell with the membranes still moist on the inside, showing that the inmate had not left it for many days. The nest being thus completely surrounded by tolerably deep water the chicks had to swim a considerable distance before reaching *terra firma* in the neighbourhood. I took the shell as a memorial and again we waded through the water to look after the birds. All the shallower places were covered with cotton grass, which grew so abundantly in some parts as almost completely to hide the water, and formed a very pretty sight. We now reached little bits of pine forest and more elevated tracts of heather alternating with smaller and larger swampy meadows, and after half-an-hour's search I discovered the birds in a meadow at some distance, walking leisurely about in all their graceful beauty. They were very busy now and then with something on the ground amongst the grass, evidently the two chicks. The man now told me that one of the chicks must be a week old and the other three or four days, as he had found the bird on the nest a week ago with one chick just hatched and the other egg still unbroken. As the birds were rather far away, we tried to approach them unobserved by going round a little pine wood, but as we were making the circuit the birds had evidently seen us and vanished, and all search in the meadow, in which the water in most places stood ankle deep, was in vain. After a rather long investigation, the small patches of forest alternating with the meadows making it impossible to obtain a general survey of the country, we at last saw the birds walking away in the distance — an amazing distance considering the age of the chicks.

We again tried to go round the trees so as to come upon the birds suddenly, and this time we succeeded in arriving within 50 feet of them, as they were passing through a wood to go to another meadow. Directly the old birds saw us, they began to run to the meadow, the little brown chaps bravely following as fast as they could. The difference in age of the two chicks now became quite apparent, the older one running very swiftly, and keeping bolt upright, whilst its younger companion tried to maintain the same pace, but had often to balance itself with its little extended wings, which

looked, featherless as they of course were, like little arms, and often stumbled over sticks or holes in the soil.

When the border of the meadow, which was very rough with long grasses and dwarf creeping willows, was reached, and the chicks gave signs of being tired, the female Crane gave a short hard note, upon which the chicks suddenly disappeared, hiding themselves in the tall grasses. Now both the old birds began to run in real earnest keeping the body in a horizontal position and head and neck very low. The cock, which could easily be recognized by its larger size, ran rather far away, even flying now and then for a few yards, with extended neck and legs, but the female ran circling round us, now and then crouching in the grass and pretending to be busy with something under her, doubtless to make us suppose that she had the chicks with her, in order to tempt us away from the place where the little ones really were. I made her believe that I was her dupe and followed her at some distance. She ran away in the same fussy way until she reached the male, when both began to trumpet loudly. As I now went off in another direction opposite to that where the chicks lay hidden, both birds leisurely stalked away till nearly out of sight, feeding now and then on the way, as if they were perfectly satisfied. Hiding behind some bushes I now saw, that when far away, they began to come back describing a large circle, keeping behind the bushes all the time so as to cover their return in the direction of the chicks. Not wishing to disturb them again I went away, to let them recover their little downy treasures in peace.

My guide, who unfortunately has the bad habit of taking the young Cranes when they are about three weeks old to sell them to Zoological Gardens, etc., told me that at that age, they run so swiftly that it is only possible to catch them if one manages to come upon them very suddenly. In that case the parents would order the chicks to squat down in the manner described, and by careful search the young birds could then be found and taken. If the old birds discover a man in the distance they will all run away, and the ground being swampy and uneven it is impossible to overtake them.

The man had taken the chicks for about fifteen consecutive years, and yet, as he believed, the identical old pair of birds came to breed in the same neighbourhood year after year. He had found that the same nest was never used two years in succession, and he had observed that if one of the old birds was surprised when sitting, and found it could not escape observation by crouching down, as it would at first try to do, it would run away, hiding between the bushes and never taking wing unless absolutely forced to do so by close pursuit.

In the district within reach of the place where my guide lived, three pairs of Cranes generally breed, but always far away from each other and in fact there are hours of walk between each breeding place. The eggs are generally laid in the last half of April. The man believed firmly, though on what evidence he could not tell, that the male always has the care of the male chick and the female of the female chick, and that the young, if there are two, which is the usual number — one being the exception and three having *never* come under his observation all those years — always form a pair.

On my way home the road led through some beautiful forests of magnificent Scotch and Spruce firs, and in the very midst of it, on a giant Scotch fir, right in the top, on a fork in a side branch, was the nest of a Black Stork (*Ciconia nigra*) from which my amiable guide had taken three young ones the year before. The nest must have been firmly made, as the winter gales had had no effect on it, and it looked quite fresh. The Black Stork is still fairly abundant in the district, and my lean companion expected to take about a dozen young birds of this species this year. The ground on which the tree, containing the nest, stood, was rather swampy, as was also the greater part of the forest, but became dried up in summer, as I was told, as also did the greater part of the ground on which the Cranes breed.

At last, after a walk of about six hours, now and then lengthened by our having to dodge local authorities, who might not have quite appreciated the character of my guide and would have put troublesome questions, and after having been very much teased by swarms of big horse-flies, we reached our village again. There for half-an-hour or more I had to search for my coachman, who had gone to sleep in some corner only known to himself, and after having taken leave of my excellent, blue-trousered guide and his little lady, I drove back to Hanover well satisfied with my day.

The Cranes which breed in the above-mentioned countries leave those localities as soon as the young are strong enough to travel. They then congregate first in small troops and finally in large flocks, and leave the country in August and the beginning of September. The more their breeding quarters are to the north the earlier in the season of course they begin their migration. The Cranes of Europe travel to the Mediterranean, a few remaining in winter on the European side of it, but the greater number cross it to winter in Northern Africa and along the valley of the Nile.

The Asiatic Cranes winter in the Yang-tse basin, these being probably the birds that nest northwards of that region, but perhaps some of these, and certainly the generality of the Cranes that breed eastward of the 60th. meridian, winter in the plains of Northern India.

Of the migration of European Cranes we find an excellent account given by Mess[rs] A. and K. Müller, (Thiere der Heimath, II, p. 440) who made special observations on the subject. They observed in the Odenwald, the Taunus and its branches, the Vogelsberg and the mountains of the Hessische Hinterwald, as it was called in former days, that the Cranes regularly follow the same aerial roads on their travels. In the Hinterwald for instance, there were two cuts in

the mountains over which the larger flocks of birds regularly passed. They also mention a high mountain plain between the villages of Günterod and Harterod in the same district, over which the Cranes travel annually, and which they often use as a resting place. When alighting they are said to describe huge spiral lines, and to ascend to their usual height of travelling in the same way when they depart. Once at the proper height they usually assume in their flight the form of a V, the side of the figure towards the wind being generally much shorter than the other, whilst often a third or more limbs are added to the figure, if the flock is very numerous. They are observed to migrate as well during the day as during the night and the clearer the weather the higher the cranes fly, whilst they only travel in the direction of the wind and never against it. The same observers mention the Island of Rügen as a place of rendez-vous for the Cranes before their departure.

Mr. E. C. Taylor mentions large flocks of Cranes in September and October on the banks of the Danube on both Roumanian and Bulgarian banks, which were evidently on their way to the south. Radde saw Cranes flying over the Caucasus at an altitude of 14,000 feet, and found them in the market at Tiflis brought there from the banks of the Chram river between the 25th November and the 7th December, whilst he saw a flock of 150 birds on the 20th August 1874 near Köprikö on the Araxes, which left for the south shortly after. More to the south Lord Lilford saw them pass over Corfu in the month of October, whilst they have also been observed passing over Italy and Spain. Once across the Mediterranean the Cranes may be said to have arrived in their proper winter quarters. Messrs Reid and Drake observed them in winter in Morocco in small flocks and Canon Tristram met with them in Algeria, while Adams found them in large flocks in Lower Egypt. Von Heuglin saw Cranes arrive in Egypt and Nubia, commencing at the end of August. Flocks were seen following the valley of the Nile, resting at midday and during the night on its banks and on the islands in the midst of the stream, and feeding in the morning and in the evening in the fields of the neighbourhood. The Cranes also winter in some parts of Portugal (Tait, Ibis 1887 p. 383), in the South of Spain, where Saunders found them near Seville on the 19th of February, and in other suitable places on the European side of the Mediterranean. Canon Tristram found that large flocks spend the winter in the open plains and downs of Southern Judea. They roost near Moladak, south-west of the Dead Sea and at another place south-east of Gaza. They arrive at sunset, being very noisy till morning, whilst during the whole night fresh flocks come to swell their ranks. The roosting place at Moladak was a group of hillocks extending over several acres and thickly covered with the mutings of the birds, as thickly as the resorts of any seafowl. In February the Cranes begin to leave their winter-quarters in Africa, travelling slowly northwards, apparently regulating their speed according to circumstances. In Tiflis the first flocks were observed passing northwards in the beginning of March. Lord Lilford saw them pass over Cyprus in the last half of April, and observed them in March at Corfu. Giglioli mentions them flying northwards over Pisa in March. Saunders saw them cross the Pyrenees towards the end of February and in March, whilst Seebohm mentions them as still travelling northwards over Ust Zylma on the 21st May, and over the Lower Petchora as late as the 25th of that month.

The Asiatic Cranes quit their breeding quarters at about the same time as those inhabiting Europe. Radde noticed them leaving the Tarei Lake, in latitude 50°, on the 26th August, and saw flocks travelling in south and south-western directions over the Bureja Mountains on the 25th August and the 2nd September. Prjevalsky in the middle of September saw flocks passing the Ala-shan range, which, when tired out and not finding a suitable resting place, settled down on the sand in order to pass the night there, and to proceed on their journey next morning. In Kansu only one flock was seen on the 16th September 1872. Prjevalsky specially notes that when camped on the river Tesunga, his tent being pitched at a height of 10,600 feet, the birds were flying over at such an enormous altitude that they could hardly be seen. Père David saw the Common Crane pass over the Pekin plains in September.

Some Cranes winter on the lower Yang-tse basin near Swatow, and others in the plains of the island of Hainan, the greater number, however, pass over the Himalayas and winter in India. In India they spread over the greater part of the continent, keeping along the rivers and in the swampy plains, but not usually or numerously passing much to the south of the 20th parallel, although they have been recorded from Travancore by Major Campbell.

In Hume and Marshall's „Game-birds of India" we find the Common Crane recorded as met with in the Nizam's dominions, Khandesh, Bera, the Central Provinces, Guzerat, Central India, Cutch, Kathiawar, Sindh, Rajputana, the North West Provinces, Oudh, Punjab, the tributary Mahals, Chota Nagpur, Western Bengal, Behar, Sikkim, Terai and the Douars, and over the whole of the Assam valley.

In Upper India and Nepal, Cranes are met with in the first days of October, but in Sind they have been observed as early as August. Like their brethren, that winter in North Africa and along the Nile, these Cranes sleep and roost near the water, going inland to feed on the fields. In the Punjab and in Rajputana, where they are not much shot at, they may be approached, it is said, by putting a native blanket over one's head, to within 60 or 70 yards, and by walking on as if one meant to pass them. Without this precaution, and everywhere else when they have reason to fear man, they are extremely difficult to approach.

The principal food of the Cranes in their winter quarters in India consists of grain, wheat, rice, etc. and in the plains of Ferozpore, Sirsa Hissar and other parts of the Punjab they are said to eat large quantities of the water-melons, with which the fields are covered after the millet has been reaped, the melons having been sown along with the grain. The Cranes peck holes in them, and make them look as if an umbrella point had been stuck into them several times.

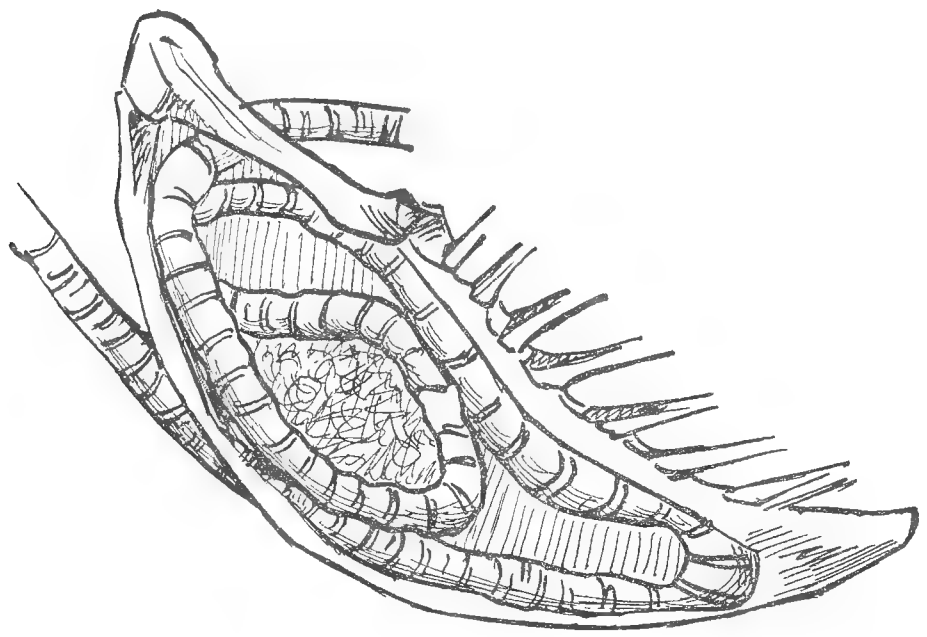
The Cranes in India begin to leave their winter quarters in the middle of the month of March in the southern districts, whilst they have been observed in the northern provinces as late as the 4th May. As to their homeward journey to the north we find it recorded by Prjevalsky that the earliest flocks arrive at Lake Koko-nor on the 17th March. Radde saw them reach Lake Tarei-nor on the 23rd April. Père David mentions their passing over the Pekin plains in the same month, whilst Swinhoe tells us that the last flock of Cranes that wintered in Hainan was observed on the 23rd March at Hoitow. From these observations I gather it as very probable that all the Cranes begin to leave for the north in the month of March, the northern birds as well as the southern ones, as otherwise they could scarcely have been seen by Prjevalsky at Lake Koko-nor on the 17th March. The birds that winter in the northern parts of India are probably replaced by birds coming from the south so that the whole of their numbers reach their breeding quarters gradually.

In Japan the Common Crane is now a *rare* occasional visitor although, as Prof. Ijima of the Science College, Tokio, informs me, it was probably more common there on migration in former days. There is no Crane of this species from Japan, so far as I know, in any European Museum. The specimen in the Leiden Museum described as *Grus cinerea longirostris* in the „Fauna Japonica" is really referable to *Grus canadensis*.

The Common Crane is often kept in confinement, and, if properly treated, lives for years. In the Zoological Garden of Amsterdam, a female in beautiful pale grey dress, lived there for 36 years, and laid two eggs regularly every year until a year before her death, so that it is probable that she did not even then die of old age but of some accidental disease. These domesticated birds get extremely tame, have strong likes and dislikes, and know well how to give proof of their animosity by furious pecks with their powerful bills.

Perhaps no other Crane can erect and show off its ornamental tertiaries to such an extent as this species, whilst the naked skin on the head is also subject to a very considerable extension. The voice is very loud and the trachea convoluted to a very great extent.

The trachea figured is from a specimen in the Museum of the Zoological Society at Amsterdam.



Trachea of Grus communis.

THE BLACK-NECKED CRANE.

2.

THE BLACK-NECKED CRANE

GRUS NIGRICOLLIS

PLATE II.

GRUS NIGRICOLLIS, Prjevalsky (Монголія и страна Тангутовъ) Mongolija i strana Tangutow[1]) St. Petersburg, 1876. 8°. Band. II, pag. 135 — id. Rowley's Orn. Misc. II. p. 436 pl. IX (1877) — Tegetmeier & Blyth, Nat. Hist. Cranes, p. 70. pl. I. (1881) — Oustalet, Nouv. Archiv. du Mus. ser. 3, VI. p. 85 (1894) — Sharpe, Cat. Bds. Brit. Mus. XXIII. p. 258 (1894).

Vernacular names. The Black-necked Crane (English); de zwarthals Kraanvogel (Dutch); la Grue de Prjevalsky (French); der schwarzhals Kranich (German).

Adult. General colour a very pale ashy grey, passing into white when the feathers get older, sometime before the moult. Feathers of the back with darkish shafts and yellowish margins, underparts almost pure white with less conspicuous yellowish than the upperparts. Tail black, upper tail coverts greyish, under tail coverts white. — Iris yellow (Prince Henri d'Orléans). Primaries and greater outer part of the secondaries black. Inner secondaries falcated, elongated, slightly decomposed and erectable. — Smaller wing coverts inside and outside pale grey. Coverts of the inner secondaries black. Spurious wing black, its coverts pale grey. — Crown of head naked with a rough red skin covered with a few small hairs. Rest of head and upper part of neck smoky black; a small white spot behind each eye.

Bill greenish horn colour. Legs black — total length 48 inches, culmen 4.8, wing 25.3, tail 9.3, tarsus 10.2.

Hab. Koko-nor (Prjevalsky): Tibet (Prince Henri d'Orleans).

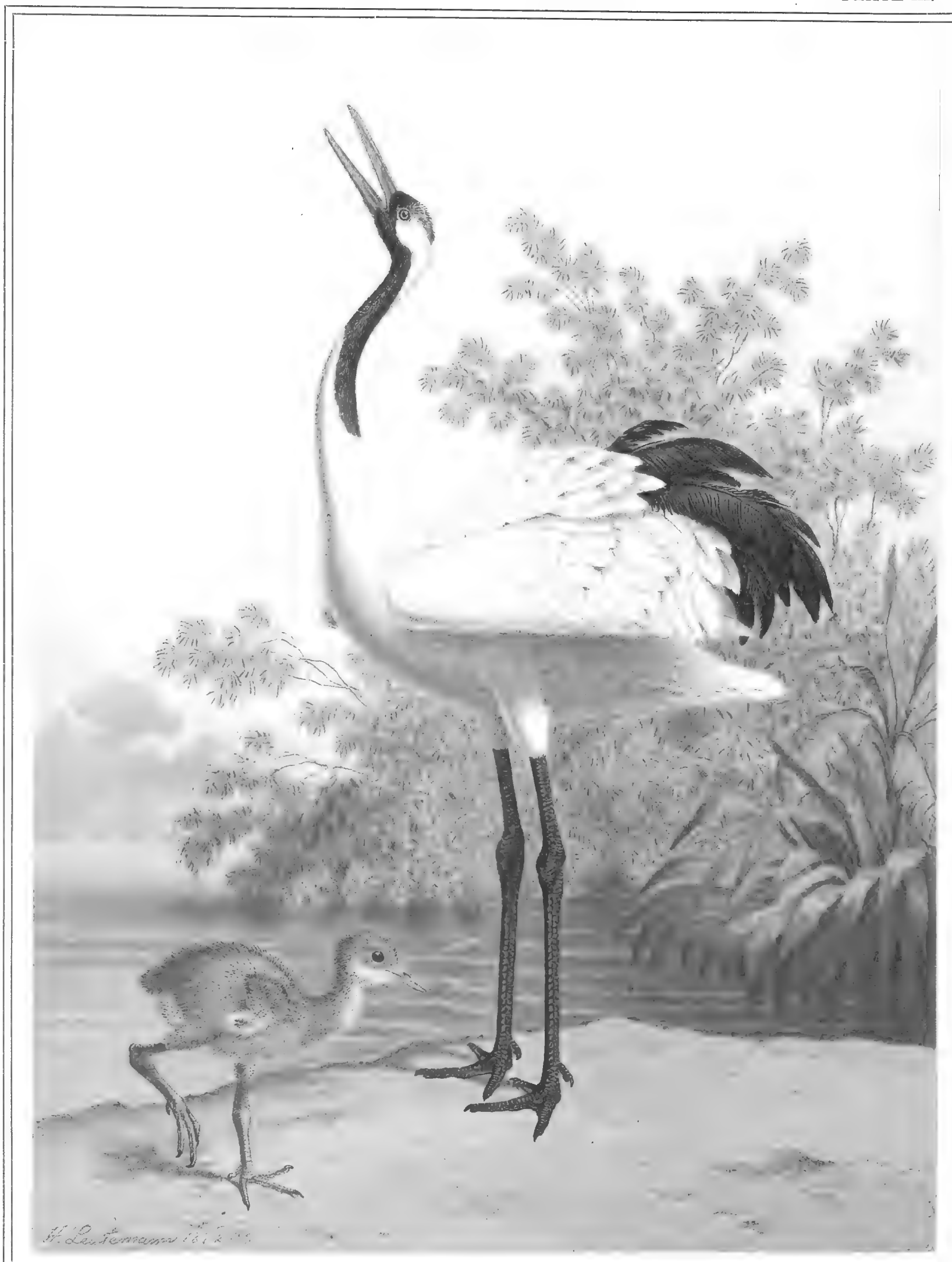
This Crane was discovered by the great traveller and naturalist Lieut.-Col. Prjevalsky who gave a description and figure of it in his "Birds of Mongolia, the Tangut country, and Northern Thibet". Prjevalsky's memoir was translated from the Russian and republished in Rowley's Ornithological Miscellany in 1877.

Prjevalsky found this Crane near Lake Koko-nor, and only saw it in that district. It arrived there on the 30th. March, probably with the intention of breeding. He describes its voice as very pleasant, and resembling that of *Anthropoides leucogeranus*. He supposed that the Koko-nor forms the northern limit of its distribution. All the specimens obtained on that occasion are in the Museum of the Académie Impériale des Sciences de St. Pétersbourg except one, which is in the British Museum, presented by Mr. H. Seebohm. This specimen has the white of the lower neck and upper back between the shoulders very much mixed with brown and is apparently in moult. I think it probable that it is a young specimen and that the immature dress of this species like that of others presents a great deal of brown.

Besides Prjevalsky's birds the only other specimen of the Crane in European Collection is in the Muséum d'Histoire Naturelle of Paris. This individual was killed on the 6th. April 1890, at Tsatang in the highlands of Tibet, at an elevation of 1250 m. by Prince Henri d'Orleans. It measured in the flesh 1.11 métres, and from tip to tip of the extended wings 2 metres.

If Tibet and the Koko-nor form the breeding range of this species its seems strange that it should not migrate in winter to the plains of northern India, but as nobody has ever noticed it there so far as I know, this bird, contrary to the habits of most of its near allies, must either be a resident in the country where it occurs, or not being numerous have been overlooked in its winter quarters either in northern India or elsewhere.

1) Mongolia and the Tangut country.



THE MANTCHURIAN CRANE, ADULT AND CHICK.

3.

THE MANTCHURIAN CRANE

GRUS JAPONENSIS

PLATE III.

La Grue du Japon, Briss. Orn. V. p. 381 (1760).
Ardea (Grus) japonensis, Müll. Syst. Nat. Suppl. p. 110 (1776).
Japan Crane, Lath. Gen. Syn. III. pt. I. p. 42 (1785).
Grus japonensis, Gm. Syst. Nat. I. p. 621 (1788) — Seebohm, Birds Jap. Emp. p. 351 (1890) — Campb. Ibis, 1892. p. 247 — Sharpe, Cat. B. Brit. Mus. XXIII. p. 258 (1894).
Grus viridirostris, Vieil. Enc. Méth. III. p. 1141 (1823) — Swinh. P. Z. S. 1863 p. 309 — Gray, Hand-l. Bds. III. p. 25. no. 10089 (1871) — Swinh. P. Z. S. 1871, p. 403 et 1873 p. 512 — Tacz. J. f. O. 1873 p. 100 et 1875 p. 255 — id. Bull. Soc. Zool. Fr. 1. p. 246 (1876) — David et Oust. Ois. Chine, p. 435 (1877) — Tegetmeier & Blyth, Monogr. Cranes, p. 53 (1881) — Seebohm, Ibis, 1884 p. 178 — Blakiston, Amended List Bds. Japan, pp. 12, 41 (1884) — Tacz. P. Z. S. 1887, p. 611 et 1888 p. 468 — Styan, Ibis, 1891 pp. 329, 502.
Grus collaris (nec Bodd.) Temm. Pl. col. Genus *Grus* sp. 4 (1828).
Antigone montignesia, Bp. compt. Rend. XXXVII. p. 661 (1854) id. Consp. Av. II. p. 100 (1854).
Grus montignesia, Scl. in Wolf's Zool. Sketches, II. pl. 46 (1861) — Bartlett, P. Z. S. 1861 p. 369 pl. XXXV — Prjevalsky, Putesch. Ussuri, p. 54 (1869) — Bogd. Consp. Av. Imp. Ross. p. 109 (1884).
Grus leucogeranus, pt. Dybowski & Parvex, J. f. O. 1868 p. 337.
Grus leucauchen, (nec. Temm.) Blakiston & Pryer, Bds. Japan, p. 121 (1882).

Vernacular names. De chineesche Kraanvogel (Dutch); the Mantchurian Crane (English); der mandschuren Kranich (German); la Grue de Montigny (French); Tancho (Japanese. Prof. Ijima).

Adult. General colour pure white, secondaries black, the innermost ones pointed, broadened and somewhat pendent, some of them being more or less decomposed and erectile. Throat and cheeks slaty grey or sometimes dark pearl grey, the same colour continuing downwards on each side and meeting towards the base of the neck behind. Some birds have the wing-coverts near the black inner secondaries slightly tinged with black or the feathers have black shafts. Forehead and crown bare, papillose, and crimson; the forehead being more or less covered according to the season with black hairs as far as just above the eyes. Bill greenish horn colour. Legs greyish black. Iris dark brown; culmen 6.3; wing 25; tail 9; tarsus 10.2; middle toe and claw 4.5 (female, Leiden Museum). — The extent of the naked skin varies in different individuals and according to the season.

Immature. All the white mixed with light cinnamon brown. Neck-collar coffee brown instead of grey. Secondaries dull black mixed with brown. Forehead and crown not bare but covered with brown feathers. Primaries white but with black points. As observed on a living bird of about a year old brought from Korea.

A bird of about 3 weeks old in the Paris museum, born in the Jardin des plantes, shows brown edges to all the feathers that are coming forth at that age.

Chick. Cinnamon brown down over the whole body, being darkest on the back and shoulders and lighter on the under parts. Bill and legs short and of a greyish flesh colour. The big tarsal joints being lightest in shade. (birds born in captivity at 's Graveland).

Egg. Figured of the natural size plate XVII nº. 2 (Specimen laid at 'sGraveland).

Hab. Eastern Siberia and Mantchuria, wintering in Corea and the Yangtse basin; a rare straggler in Japan.

This is the Crane so well known from the numerous figures of it drawn on all sorts of Japanese works of art. From its constant appearance before the public in this way, and from the more or less incorrect accounts of it received from Japan (beginning with what Kaempfer says of it in his 'Birds of Japan') it has become the general belief that this crane is a native of Japan and is held sacred by the Japanese. On this subject, however, Prof. Ijima, of Tokio, gives me the following information: — "All Cranes, especially *Grus japonensis*, as well as turtle-doves are considered by Japanese as "symbolical of long life. On this account, and also on account of their beauty, they are universally admired, and often "kept in gardens. In olden times they were placed in the first class of Game-birds for noble hawkers, and hence were "very strictly protected. *I should not say that Cranes were ever held in any degree sacred*, for every hawker and gunner "would have killed them if they could, either for sport or for the sake of their flesh. I do not think that the latter was "relished by anybody, but it was nevertheless valued, partly for its rarity and partly on account of the belief that it "gives longevity to those who eat it."

The breeding range of this Crane extends over Eastern Siberia and Mantchuria. In 1867 Dr. Dybowski saw a flock of it near Darasun, and also observed it near the mouth of the Ussuri. Bogdanow found it in the same locality, and also on Lake Hanke, where it was likewise observed by Prjevalsky in 1867. It has been stated that this Crane breeds, or has bred in the Japanese Archipelago, but Prof. Ijima is of a different opinion. He writes to me "I doubt "very much the statements that certain species of Cranes used to breed naturally in Japan. Were they not based on "information given by natives, who confounded birds in confinement with those in a free state? Or it may be that the "imaginary pictures of *Grus japonensis* nesting on a tall pine tree, so often met with in Japanese works of art, had a "great deal to do with the matter. The more reliable old Japanese works on birds agree in considering all the Cranes "as *foreign* birds, and in giving autumn as the time of their appearance in Japan. Nowhere is their nesting mentioned, "except in one instance, in which the author was *told* of a pair of *Grus japonensis* that annually bred near a marsh at "the foot of the Fuji. The author seems not to disbelieve the story, but explicitly terms it a very rare and exceptional "case. One author condemns the habit of artists who paint this bird as perching or as nesting on tall trees, and says "that cranes make their nest on islands in ponds (it is evident that he is speaking of birds kept in gardens) among bushes "of low pine trees, at a height of about one or two feet from the ground, so that the bird can incubate while standing "on foot. *Grus japonensis*, although the commonest species represented in pictures in Japan seems to have been by no "means so in real life."

I think that there is an explanation for this artists' practice of figuring *Grus japonensis* perched and nesting on tall pine trees. The Japanese Stork (*Ciconia boyciana*) has a superficial resemblance to *Grus japonensis*, and the native artists not being ornithologists may have mixed up the Crane with the Stork in their pictures — thinking perhaps that two birds which are so much alike in feather must necessarily also resemble each other in their habits. It is even possible that the artists did not know that they were not one and the same bird.

I can find no information about the nesting of this species in a wild state, but in confinement it is a ready breeder, and produces eggs and young more regularly than any other species. Japanese Cranes have bred for several seasons at the Ménagerie du Muséum d'Histoire Naturelle of Paris, in the Gardens of the Zoological Society of London, and also in many private gardens both in China and Japan. My own pair at 's Graveland have bred regularly every year since 1892. The female of this pair was still in immature dress when I received her, whilst the male was quite adult. In 1891 they began to build a nest, but as the female was probably still too young no eggs were laid. As the male wanted to sit and there were no eggs, he pulled up from the bottom of the pond two large pieces of brick and placed them in the nest. He then began to sit on them, and soon afterwards the female began to take her turn, so that everything went on as regularly as if there had been actual eggs. When I took the bricks away after some weeks, the birds were very angry, and made a nest at another place and placed two new bricks in it.

In the early spring of 1892 my birds again became very lively, and constructed a nest composed of a few dry grasses close by the pond in their enclosure In the beginning of May the first egg was laid, the female being then five years old. The birds began to sit immediately, and the second egg followed two days after. Both the birds incubated, the male mostly during the night and the female usually during the day. After thirty days from the laying of the first egg, a small hole became visible in the shell of one of the eggs, and the bill of a chick could clearly be seen. The following day the shell was completely opened, and the chick was set at liberty. Just as the first chick was born the bill of the second became visible on the surface of the other egg, and the chick came out complete on the evening of the following day. So soon as the first born young became strong it wanted to run about, and was conducted at a small distance round the nest by one of the parents, the other one remaining on the nest to keep the second little one safe. During this period both parent birds sat on the nest during the night, each of them having one chick in charge. This

state of things lasted for three nights. After this time one bird only, the female, sat at night on the nest, having a chick under each wing while the male stood close by keeping watch, and raising an alarm whenever anything unusual caught its sight or hearing.

After the little birds had got strong they became very active and even playful, running round each other with expanded wings or what were to become wings in time, and nimbly catching the worms and small pieces of meat and bread presented to them by the parents. Two days after they had been hatched I saw the whole family pass through the pond. The water was rather deep so that the old birds could just wade through it, and the chicks followed, swimming as readily as little geese.

Unfortunately these interesting little birds did not come to maturity, but, having caught cold on a change in the weather, died after a few weeks. The death of these birds gave me occasion to admire the superior intelligence of these Cranes. Most birds when their young are ill neglect them, and if they have many young ones desert the sick to look after the healthy ones. Not so with my Cranes. When one of the chicks became ill and feeble they took all possible care to feed it properly, and to prevent the stronger one from snapping away the food from it. They used to hold the food away from the strong one, and present it again and again to the weaker bird. About six or seven hours before its death when the little patient resolutely refused all food, the parents left off offering it food, but one of them sitting down (which they do very rarely during the day when the young are in good health) induced the chick to go under its wing. A little later when the young bird became very restless and fell down, the old bird gently supported the ailing chick with its bill, and when it was dead screamed loudly, apparently in great distress, in concert with its mate. Even then it did not leave the dead chick, but sat over it for a couple of hours now and then examining it with its bill as if to assure itself that it remained really insensible.

The death of the second chick caused no less grief to the Cranes, and when they had convinced themselves that nothing they did, could bring it back to life, and it had been taken away from them, they screamed in despair for several days taking scarcely any rest even during the night.

The chicks of this Crane have a curious way of going under the wing of the parent. As the mother sits on the ground the chick creeps under the black inner-secondaries, and gradually advancing, finds its way along the flank and so under the wing of its mother.

The Mantchurian Crane is migratory, going south in autumn to spend the winter in Corea and the Yangtse basin in China. On this subject Mr. C. W. Campbell writes in "The Ibis" [1]): "The first blast of icy wind brings the Manchu-"rian Crane down in small numbers from the north. This seems to be generally in October. Later on large flocks may "be seen travelling in much the same formation as geese, though more slowly and irregularly, and at a very great "height. The piercing cry of these birds is often heard before they themselves are visible. During the winter many "are snared for export to China and Japan, where they are held in high estimation as birds of ornament".

Taczanowsky [2]) gives us nearly the same information, adding that this Crane is common in Corea during the winter only north of Seoul, being rare in the south, and that it is never found there in summer. Styan met with Japanese Cranes in winter on the Yangtse and on the Poyang Lake.

In Japan this Crane is a rare winter visitor, and its occurrence there, as Prof. Ijima informs me, is always reported in the newspapers and made known to the Imperial household by the Local Administrators. The Japanese Crane was not obtained by Siebold's collectors for the Leiden Museum. In the Museum of Mr. Walter Rothschild at Tring there are two skins of this species from Japan, one a female marked "Satsuma 1892" and a second one, a male, marked "Osumi". Mr. Ringer has also sent an example from Nagasaki. Of course some doubt remains whether those birds were genuine wild shot birds, as these Cranes are so often kept in a tame state in the Japanese Empire.

The first of this species brought to Europe alive were probably the two birds presented to the Ménagerie du Muséum d'Histoire Naturelle in Paris on the 1st April 1854, by Monsieur de Montigny then Consul of France at Shanghai. These birds were both males, but on the 18th April of the same year Monsieur de Montigny presented a third specimen which proved to be a female, and from this female, with one of the males first given, several young ones were bred in the first years of their introduction.

The Zoological Society of London received their first specimens of this Crane in 1856. They were presented by H. M. the Queen, and bred in 1861. (see Bartlett, P. Z. S. 1861 p. 369 pl. XXXV). In Amsterdam the Zoological Society received their first birds in 1860. I may add that they were the special pride of the late Director, Dr. G. F. Westerman, who was at that time forming the beautiful series of Cranes which he always kept up during his Directorship.

The Mantchurian Crane has always been very scarce in European collections, as up to the last few years very few specimens have been imported. This is probably to be attributed to the esteem in which it is held by the Chinese

1) A list of Birds collected in Corea. Ibis, 1892, p. 230.
2) Liste supplémentaire des Oiseaux recueillis en Corée par M. Jean Kalinowski. P. Z. S. 1888, p. 450.

and Japanese, who themselves value it very highly as a bird of ornament and as furnishing a dish at a banquet which tends to promote longevity, and therefore do not like to part with it to Europeans.

The first great importations of this Crane began about seven years ago, when Dr. Bolau, the Director of the Zoological Garden of Hamburg received them in unusual numbers from Corea, where he had a correspondent. Since that time these Cranes have been acquired by most of the larger continental Zoological Gardens, but not being treated properly most of them soon died. In 1893 the late Capt. E. W. Marshall brought home from a trip to Japan seven or eight of these birds, which, as he told me, had been snared for him in Corea. Now and then Mr. William Jamrach is also able to supply his English customers with specimens of this grand bird.

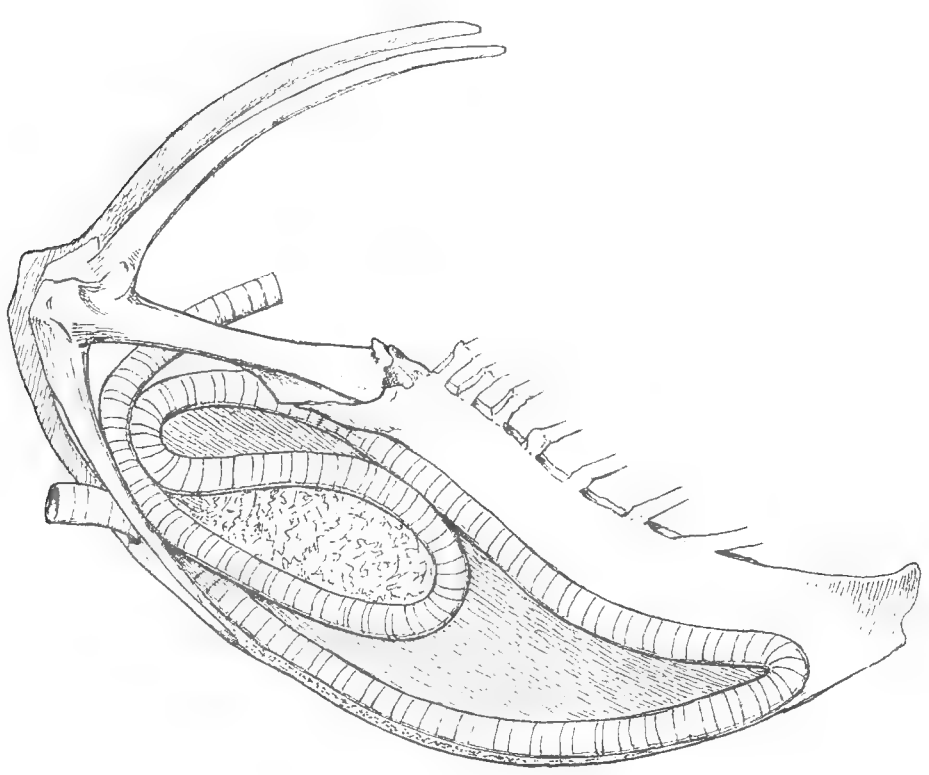
These Cranes live well in confinement but want more care than some of the other species do. They are very partial to water and require a liberal supply of animal food (fish, meat, etc.). They do not do well on grain alone, and the more spacious the enclosure and the larger the piece of water at their disposal the better. In the water assigned to them they will be seen walking kneedeep the greater part of the day searching for insects and other food. They do not mind the cold in the least, and will stand for hours with apparent satisfaction in a hole in the ice during a severe frost. They are very playful amongst themselves, and are untiring in performing eccentric dances and movements, expecially during the pairing season.

I have made notes about the moulting of the wing-feathers of this species, and Lord Lilford, who at my request had this question carefully looked into, in the case of the birds in his collection, confirms my observation that the primaries are all dropped at once (in the same way as with geese) rendering the birds unable to fly. In my own birds I found that this moult took place shortly after breeding, and that the large wing-feathers (not the small ones) are only shed every other year.

Of course I cannot tell if the same thing occurs in a wild state, but in confinement I have noticed it for several years.

The voice of this Crane is very loud and may be heard at a very great distance.

The trachea in this species is very much convoluted and closely resembles that of *Grus communis*. The trachea figured is from a specimen in the Zoological Museum of Berlin kindly lent to me for that purpose by Prof. Reichenow.



Trachea of Grus japonensis.

THE HOODED CRANE.

4.

THE HOODED CRANE

GRUS MONACHUS

PLATE IV.

GRUS VIPIO, Pall. Zoogr. Ross.-As. II p. 111 (1811)?

GRUS MONACHUS, Temm. Pl. Col. V. pl. 555 (1835) — Gray, List *Grallae* Brit. Mus. p. 74 (1844) — id. Gen. Bds. III. p. 552 (1845) — Temm. & Schleg. Faun. Jap. p. 119. pl. 75 (1850) — Bp. consp. II. p. 98 (1854) — Swinh. P. Z. S. 1863 p. 309 — Radde, Reis. im Sud. von Ost Siberien, p. 318 (1863) — Schleg. Mus. P.-B. *Ralli*, p. 4 (1865) — Swinh. Ibis, 1867 p. 413 — Dybowski & Parvex, J. f. O. 1868 p. 337 — Swinh. P. Z. S. 1871 p. 402 — Gray, Handl. Bds. III. p. 24, n°. 10081 (1871) — Tacz. J. f. O. 1873 p. 100 (über in untern Ost. Sibirien von Dr. Dybowski) et 1874. p. 336, id. Bull. Soc. Zool. France, I. p. 246 (1876) — David et Oust. Ois. Chine, p. 434 (1877) — Blakiston & Pryer, Ibis, 1878 p. 224 — Prjevalsky in Rowley's Orn. Misc. III. p. 47 (1878) — Tegetm. & Blyth, Monogr. Cranes, p. 71 (1881) — Blakiston & Pryer, Birds of Japan, p. 121 (1882) — Seebohm, Ibis, 1884 p. 178 — Blakiston, Amended List Birds of Japan, p. 24 (1884) — Bogdanow, Consp. Av. Imp. Ross. p. 108 (1884) — Seebohm, Ibis, 1884, p. 178 — id. Bds. Jap. Empire, p. 353 (1890) — Styan, Ibis, 1891 pp. 329, 502 — Sharpe, Cat. Bds. Brit. Mus. XXIII. p. 257 (1894).

ANTIGONE MONACHUS, Bonap. C. R. XXXVIII. p. 661 (1854).

Vernacular names. The Hooded Crane (English); la Grue moine (French); de monniks kraanvogel (Dutch); der mönchs Kranich (German); Nabezuru (Japanese).

Adult. General colour above and below, slaty grey with brownish margins to the feathers of the upper surface, especially visible on the wing coverts, and greyish margins to the feathers of the under-surface. Primaries and secondaries also the tail and its coverts, slaty black. Inner secondaries lengthened, falcated, decomposed, and drooping. Forehead covered with black hairlike bristles. Fore part of crown covered with a rough red skin on which are only a few black hairs, so that the red skin is visible. This red skin becomes much more apparent in the breeding season. Head and greater part of the neck pure white, slightly tinged with grey, except in the breeding season, when the white becomes pure. The white of the neck descends further down behind than it does in front, by about three inches. Bill yellowish horn colour. Upper-eyelids naked and of the same colour as the bill; under eyelids covered with white feathers. Iris orange-brown. Legs and feet black horn-colour. (Description from a living bird at Lilford Hall).

Total length about 34; but varying rather much. Wing 21′, tail 7′, tarsus 8½′, middle toe & claw 4′, culmen 4½′, (Bird in the Leiden Museum).

Immature. Radde describes birds of the year in autumn as being brownish black, but does not say what colour the head and neck are at that time. Older but still immature birds have the naked parts of the head covered with greyish-white feathers, lores with black bristles. On closer examination it becomes evident that the greyish colour of the frontal white feathers is to be attributed to the shafts of those feathers being black, while the webs are whitish. From this reason the white of the neck is not sharply defined but gradually passes into the slate colour of the body. Radde informs us that in the third year the forehead and crown are covered with shining black bristles and that after this time only, the fore part of the crown becomes naked so that the red skin becomes visible.

Chick unknown.

Egg. „

Hab. Eastern Siberia, wintering in China, Corea, and exceptionally in Japan.

This is probably the *Grus vipio* of Pallas, although the description, taken from Gmelin's manuscript, is not quite

accurate. But as the size of *G. vipio* is mentioned as being smaller than that of *G., virgo* the description certainly agrees better with the present species, (which is about the size of *A. virgo*, although generally a little larger) than with *A. leucauchen*. Besides, it being quite evident that the *Grus antigone* of Pallas is *A. leucauchen*, there is no other Siberian species that *G. vipio* could refer to. Leaving however, Pallas's description founded on Gmelin's Manuscript for what it may be — quite a matter for conjecture at the best — the first accurate account of the present Crane was given by Temminck in his "Planches Coloriées" in 1835, along with a good figure in which the soft parts only are inaccurate. Temminck knew the bird only from Japan, from which country it was sent to him by von Siebold with the remark that it also occurred in Corea.

The Hooded Crane extends in summer from North Western Mongolia eastwards over the southern part of Eastern Siberia and Lake Baikal northwarts of the Gobi desert, and along the Amoor provinces southwards to Lake Chanka. Radde met with it in the North Eastern part of the High Gobi, on the middle course of the Amoor, on the Chinese side of the Bureja Mountains, and at the mouth of the Selbadian rivulet. Dybowski found it numerous on the banks of the Onon in Southern Transbaikalia, and Bogdanow records it from the Ussuri.

In former times it is said to have bred in Japan but Prof. Ijima, of Tokio, informs me this is not quite certain notwithstanding the statements that have been made to that effect by Temminck and Père David.

I can find, unfortunately, no account of the breeding of this species, although descriptions of young birds in different stages are given by Radde (as quoted above). Temminck's account of its nesting on high trees is certainly founded on some error.

The Hooded Crane leaves its breeding grounds in the north in the month of August to pass the winter in China, also visiting Corea and Japan. Dr. Dybowski saw it on migration in Darasun at the end of August. Styan records it as being common on the Yangtse in winter, and from here the specimens procured in the Shanghai market at that same season by Swinhoe evidently also came.

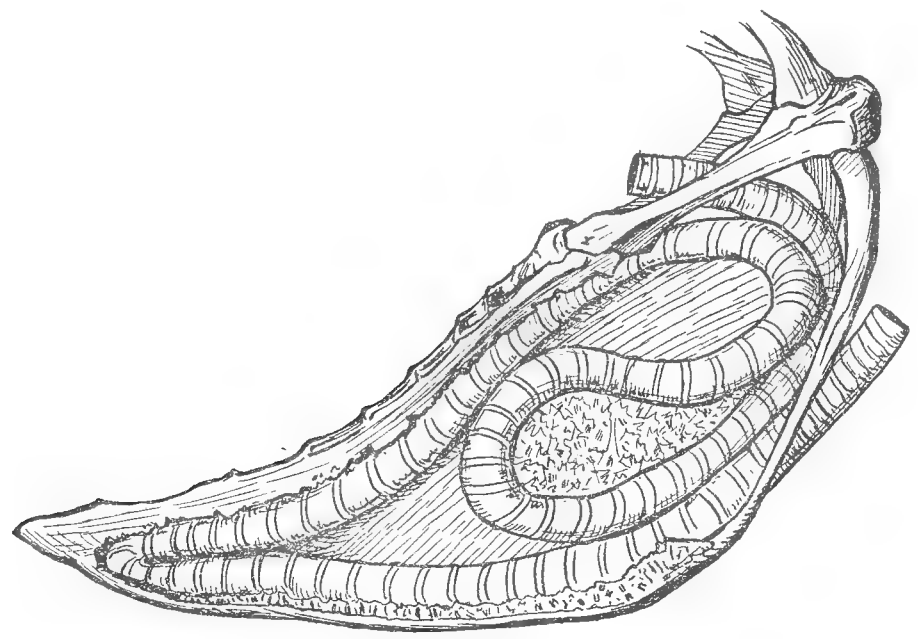
Prjevalsky witnessed the first arrival of this Crane in South-Eastern Mongolia on the 11th March, but the principal flocks did not come in until the middle of April.

In Japan at the present day, as Prof. Ijima informs me, this Crane is probably a migrant only. Canon Tristram tells me he saw a flock of five of these birds in April 1891 travelling northwards over Mogi at the south entrance of the inland sea, on the north coast of Kiusiu. Mr. Ringer procured specimens near Nagasaki.

Père David tells us that this species travels in small troops, and mentions that having killed the male of a pair out of a troop passing over the plains of Pekin, the female alighted near its dead mate and tried to revive it by carefully supporting it with its bill.

This Crane has always been extremely rare in confinement in Europe. The authorities of the Zoological Garden of Amsterdam never succeeded in getting a living specimen. The Zoological Society of London obtained a single example in November 1876. Besides this I know only of one other specimen, which at the present time is in the Cranery at Lilford Hall, standing on one foot, I am sorry to say, as it has lost half the other leg by an accident.

The trachea of this crane closely resembles that of the preceding species. The specimen figured is from a bird obtained in Corea.



Trachea of Grus monachus.

THE AMERICAN CRANE.

5.

THE AMERICAN CRANE

GRUS AMERICANA

PLATE V.

THE HOOPING CRANE, Catesby, Nat. Hist. W. Carolina, I. p. 75, pl. 75 (1731) — Edwards, Nat. Hist. Bds. p. 132 pl. 132 (1751) — Pennant, Arct. Zool. II. p. 442 (1785) — Lath. Syn. Bds. III. pt. 1. p. 42 (1785).

LA GRUE D'AMÉRIQUE, Briss. Orn. V. p. 382 (1760) — Daubenton, Pl. Col. VIII. pl. 889.

ARDEA AMERICANA, Linn. Syst. Nat. I. p. 234 (1766) — Gmel. Syst. Nat. I. p. 621 (1788) — Wilson, Amer. Orn. VIII. p. 20. pl. 64. fig. 3 (1814).

LA GRUE BLANCHE, Buff. Hist. Nat. Ois. VII. p. 308 (1780).

GRUS CLAMATOR, Bartram, Travels in Florida, p. 292 (1791).

GRUS AMERICANA, Vieill. Nouv. Dict. d'Hist. Nat. XIII. p. 557 (1817) — Temm. Man. p. c [100] (1820) — Audub. Bds. of Amer. V, pl. 313. p. 188 — Swains. & Richards. Faun. Bor.-Amer., Birds p. 372 (1831) — Nutt. Man. II. p. 34 (1834) — Audub. Orn. Biogr. III. p. 202, pl. CCXXVI (1835) — Gray, List *Grallæ* Brit. Mus. p. 74 (1844) id. Gen. B. III. p. 552 (1845) — Reichenb. Handb. Fulic. tab. 214, fig. 429, tab. 217, fig. 286 (1852) — Bp. Consp. II. p. 99 (1854) — Cass. in Baird, Cass. & Lawr. B. N. Amer. p. 654 (1860) — Blakiston, Ibis, 1863 p. 128 — Schleg. Mus. P.-B. *Ralli*, p. 4 (1865) — id. Jaarb. Natura Artis Magistra, p. 161 pl. II (1866) — Dress. Ibis, 1866 p. 30 — Turnb. B. East Pennsylv. p. 61 (1869) — Gray, Hand. L. B. III. p. 24, nos. 10085 & 10086 (1871) — Trippe, Proc. Essex Inst. VI. p. 118 (1871) id. Proc. Bost. Soc. Nat. Hist. XV. p. 240 (Iowa) (1872) — Aiken, t. c. p. 209 (Wyoming and Colorado) — Schleg. De Dierentuin te Amsterd. p. 260 (1862) — Coues, Key N. Amer. B. p. 271 (1872) — Allen, Bull. Mus. Comp. Zool. Cambr. III. p. 182 (1872) — Coues, Birds N.-West, p. 530 (1874) — Ridgw. Ann. Lyc. N. Y. X. p. 387 (1874) — Merrill, Pr. U. S. Nat. Mus. I. p. 165 (1878) — Sennett, Bull. U. S. Geol. & Geogr. Surv. IV. p. 61 (Texas) (1878) — Coues, t. c. p. 646 — Mayn. B. E. N. Amer. p. 424 (1879) — Ridgw. Pr. U. S. Nat. Mus. III. p. 202 (1880) — Tegetm. & Blyth, Monogr. Cranes, p. 54 (1881) — Coues, Check-l. N. Amer. B. p. 108 (1882), id. Key N. Amer. B. 2nd ed. p. 666 (1884) — Baird, Brew. & Ridgw. Water-B. N. Amer. I. p. 404 (1884) — Drew, Auk, II. p. 18 (1885) — Agersborg, t. c. p. 287 — Anthony, Auk, III. p. 164 (1886) — A. O. U. Check. L. p. 139 (1886) — Lloyd, Auk, IV. p. 185 (1887) — Ridgw. Man. N. Amer. B. p. 135 (1887) — Beckham, Pr. U. S. Nat. Mus. X. pp. 637, 650 (1887) — Thomps. Pr. U. S. Nat. Mus. XIII. p. 491 (1890) — Macfarlane, Pr. U. S. Nat. Mus. XIV. p. 425 (1891) — Chamberlain's Nuttall Orn. E. N.-Amer. II. p. 76 (1894).

GRUS STRUTHIO, Wagl. Syst. Av. *Grus* sp. 6 (1827).

GRUS HOYANUS, Dudley, Proc. Acad. Nat. Sci. Philad. VII. p. 64 (1854) — Hartl. J. f. O. 1885. p. 336 — Stimpson, Trans. Chicago Acad. Sci. I. p. 129, pl. 19 (1868).

LIMNOGERANUS AMERICANUS, Sharpe, Bull. B. O. C. I. p. XXXVII (1893), id. Cat. B. Brit. Mus. XXIII. p. 259 (1894).

Vernacular names. The Whooping Crane (English); de Amerikaansche Kraanvogel (Dutch); la Grue d'Amérique (French); der weisse Amerikanische Kranich (German).

Adult. Pure white, primaries, primary-coverts and bastard wing black; on the nape a more or less apparent patch of slaty black feathers. Crown of head, forehead, cheeks and lores devoid of feathers. Forehead thickly covered with hairlike black bristles which completely hide the skin. Cheeks and lores also covered with similar bristles, but less densely, so that the bare skin which is of a vivid flesh colour is generally, but not always, visible. Crown of head almost completely naked, especially towards the nape and covered with a rough flesh-coloured skin. Bill yellow horn-colour pink at the base. Iris pale straw colour. Leggs and feet black. Inner secondaries lengthened, widened and pointed, decomposed, and pendant, erected in a patch when the bird shows off in the breeding season. Wing 22½′, tail 8′, tarsus 11¾′, middle toe & claw 4,8′, culmen 5½ (bird in the Leiden Museum).

Immature. General colour cinnamon-brown, mixed with white, primaries black. Parts of the head which are naked or more or less covered with black bristless in the adult, covered with brown feathers. Black bristles of lores, cheeks

and forehead becoming visible between the brown feathers. Ornamental tertiaries more or less decomposed and developed as in the adult birds but cinnamon brown instead of white [1]).

Chick. Unknown but probably not very different from the chick of *Grus communis.*

Egg. Figured, of the natural size, plate XVII nº. 3 from a specimen laid in the Zoological Garden ot Amsterdam.

Hab. Central North America, north to the Great Slave Lake, south to the 43rd parallel, wintering in Florida and Central Mexico.

The earliest author by whom I find this Crane mentioned is Hakluyt [2]) who tells us how Captains Amadas and Barlowe, on landing on the island of Wokokon in the mouth of July 1584, found great numbers of Cranes for the most part white, and describes the noise they made "as if an army of men had shouted together". Catesby gave a plate of the head of this bird in 1731 and described it from a complete skin obtained from an Indian, who had made use of it for his tobacco-pouch. He also mentions its having been seen by a white man at the mouths of the Savannah and other rivers of South Carolina. Edwards described and figured this Crane in 1751 from a bird brought home from Hudson's Bay by Mr. Isham, who found it there in summer.

In the accounts of early writers there has always been much confusion between this species in its immature brown dress and *Grus canadensis*, and neither Wilson nor Audubon seem to have had the sligtest suspicion that two species of Crane inhabited North America. This is rather surprising in the case of two such acute observers of bird-life as these authors, as in reality the immature dress *G. americana* and the adult and immature dresses of *G. canadensis* bear but very slight resemblance. *G. americana* in young plumage is of a cinnamon brown, which colour becomes more and more mixed with white as the bird advances towards the adult stage, but is always *without* any mixture of *grey*, whilst *G. canadensis* in all its forms, (the large and the small), presents a *bluish grey* dress when adult, and *nearly* the *same* colour when immature, except that the grey feathers, especially those of the upper parts, show brown margins. The different arrangement of the naked parts of the head is also very noticeable.

The American or Whooping Crane, as it is often named, is almost entirely confined to Central North America, breeding in the northern parts as far north as the Great Slave Lake. Here two eggs were taken by Mr. J. Lockart, which are now in the United States National Museum. According to Baird the regular southern limit of the breeding range of the bird is about the 43rd parallel, while a few nest more to the south in the prairies of Central Illinois and Iowa.

It seems however that this bird also occasionally breeds in the Southern States, as Mr. Dresser in June 1863 saw a couple of them in a lagoon at Matamoras (Southern Texas), and afterwards a small flock of seven or eight, in the same district. He was informed by the natives that they bred in a lagoon some distance to the south-west of Bagdad (Bocca del Rio Grande). Unfortunately Mr. Dresser could not go there himself. In former days they probably bred in Virginia as Capt. Amadas found them there in large flocks in July both in the white and the immature dress. I also find it mentioned by Thompson in the Proc. of the U. S. Nat. Museum that it is frequent in Mouse-river country in August, September and October (*Coues*), that it is a tolerably common summer resident in Winipeg (*Hire*), that it breeds near Oak Point, arriving in April and May (*Small*), that it is a rare summer resident near Westbourne (*Nash*), that it breeds near Shoal Lake (*Thompson*) that it breeds in the marshes between Moose-mountain and the Pipestone (*Macoun*), and that it is a transient, not breeding, visitant on Shell River, passing north (*Calcutt*). Macfarlane did not succeed in finding nests of this bird, but saw flocks fly past Fort Anderson (Indiana) in spring and autumn so that he was quite sure that it breeds in Arctic America. Trippe says that it occasionally breeds in Minesota, and is quite common there during migration.

The information we have concerning the breeding of this species is still very incomplete. Nuttall informs us the nest is built on the ground in a tussok of long grass in some secluded solitary swamp. It is also added that the birds sit on the nest with "extended legs". This must be regarded as very doubtful, as Cranes do not usually sit on their nests in that way. The eggs are stated to be two in number.

Latham also mentions the breeding of this species on the ground, the nest being formed of grass and feathers, and the number of eggs laid as two.

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1) Description of an immature bird in the Provincial Museum in Hanover where it is wrongly identified as *Grus leucogeranus*.

2) The principal navigations by Hakluyt a preacher and sometimes student of Christchurch in Oxford 1598—1600. Vol. III, p. 246, under the following head "The first voyage made to the coasts of America with two barks wherein were Captaines M. Philip Amadas and M. Arthur Barlowe, who discovered part of the country now called Virginia in 1584, written by one of the said captaines and sent to Sir Walter Ralegh, knight, at whose charge and direction the said voyage was set forth".

Audubon speaks of the capture by his son in December 1833 on Spring Island of a young bird of this species. This specimen, however, which is now in the British Museum is referable to *G. canadensis*.

It has been stated, apparently on the authority of Sir J. Richardson, that the Whooping Crane breeds in the immature dress. I do not find anything of this kind recorded in the "Fauna Americana Borealis" where the description (p. 372) leaves no doubt that *G. canadensis* is really intended by the author. Otherwise he could not have spoken of yellowish *grey* birds, as grey never occurs in *G. americana* in any stage of its plumage.

The Whooping Crane is a migratory bird. From the accounts given of this species, I gather that the birds with their young begin to flock in July, August and September, finally travelling southwards in October, but sometimes lingering on the way as late as December. They push southward as far as Florida, Louisiana, Southern Texas and Central Mexico, where they spend the winter. They live there, both in the interior and near the sea coast, keeping in flocks all the while, associating, but not altogether mixing, with flocks of *G. canadensis*. Wilson found Cranes of this species in South Carolina in the month of February, whilst Nuttall met with them at that same season of the year around the swampy ponds of Western Florida and throughout Georgia. According to Nuttall and Sir J. Richardson these Cranes generally travel by night. The usual route seems to be along the valley of the Mississippi, where Nuttall heard them passing during the night in vast flocks (judging from the noise they made) during his descent of that river in December 1811. Audubon observed them on migration, as well during the day as at night, and regardless of wind or bad weather. He saw them travel sometimes in a long line and sometimes in a triangle, the birds calling loudly nearly all the time. During the winter these Cranes spend their time on the edges of ponds and marshes, also visiting the fields and swampy woods. They feed on frogs, fishes, rats, mice, moles and even small alligators, and are very partial to the Sweet Potatoes which they find in the fields during the winter and dig out with great perseverance. They also eat grain of different kinds.

In the beginning of April these Cranes begin to leave their winter-quarters travelling northwards to their breeding places. Aiken observed them during migration in Wyoming and Colorado. Agersborg mentions this species as a rare migrant in Southern Dakota. Nash records it as arriving near Westbourne in April and Thompson mentions it as a migrant in Carberry, whilst Calcutt saw the first arrivals passing northwards on Shell-river on the 30th April 1885. Guernsey saw it cross over White-sand river from the 28th April to the 1st May. Stimpson says it is not untfrequently found in a young state in the vicinity of Chicago. Allen was informed that it is tolerably common in the Valley of Great Salt Lake in spring and autumn.

The result of these observations is that the American Crane leaves its winter-quarters in the south at the beginning of April, and arrives at its breeding-quarters in the north towards the end of that month or the beginning of May. From its occurrence in spring and autumn near Great Salt Lake it is evident that high mountain ranges form no impediment to the travels. If this had been the case the intervention of the Rocky Mountains would have prevented their appearance during migration on the above-named lake.

The American Crane is described as a very wary bird with a powerful flight and as very difficult to approach. Audubon gives a curious account of how a wounded bird of this species turned round on its pursuer and finally gave him chase, driving him till he reached his boat, when the poor bird's pluck was rewarded by an ignominious death from the boat's crew.

These birds frequent, as a rule, marshy and low lands, constantly digging up the ground in quest of their food, which consists of animal as well as of vegetable matter. They feed during the day, and spend the night in the marshes or on some hillock. Audubon states that these Cranes also pass the night on the largest branches of high trees, crouching like turkeys after a while, but as this is quite unusual for Cranes to do, I suspect that in this case the Great Blue Heron has been mistaken for the Crane. These Cranes are said occasionally to soar round in circles at a great height inspecting the country.

The American Crane lives well in confinement. The first pair of this species acquired by the Zoological Society of Amsterdam was purchased in 1865 at the Antwerp sale, having been imported by Mr. Charles Reiche, whilst the Zoological Society of London bought their first pair in 1868, also at Antwerp. These last birds were in brown immature dress. Since that date Whooping Cranes have been regularly exhibited in the Amsterdam, and in other continental gardens, as well as in those of the Zoological Society of London, although they are never very plentiful in the animal market and of late years have even become very scarce. I believe Mr. C. Reiche of Alfeld is one of the few dealers who import them occasionally.

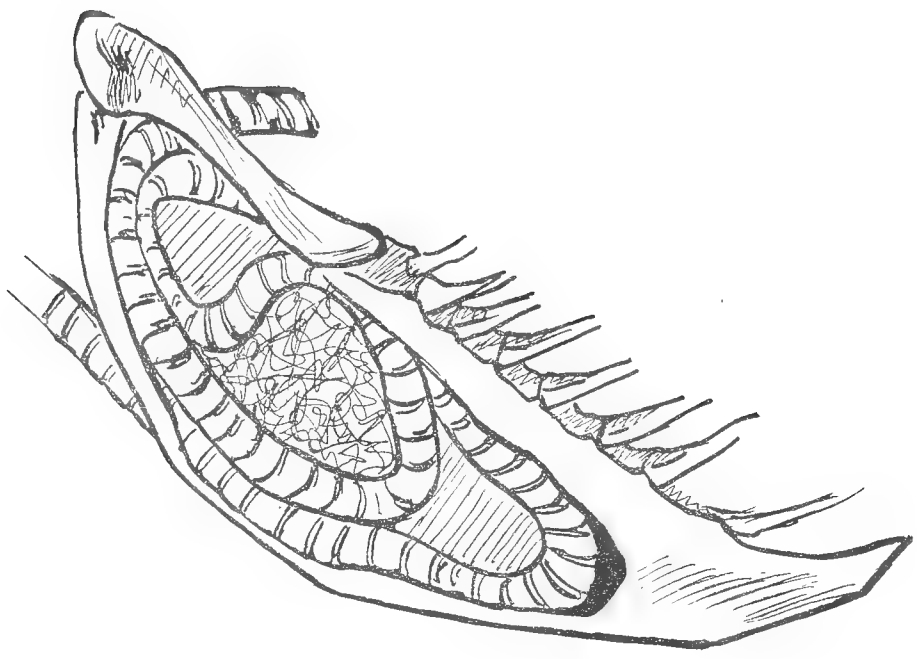
The only birds of this species living in confinement that I know of at the present time, are a pair at the Amsterdam Zoological Garden, and another pair in the private collection of Lord Lilford at Lilford Hall.

The voice of these birds is very powerful, and in confinement as well as in a wild state they often use it.

When courting the male walks round the female with very grave and measured steps erecting its ornamental inner

secondaries and distending the naked skin of the head till it extends down the neck, the colouring of it becoming much intensified.

The trachea of this species is extremely long and convoluted making several complicated folds in the keel of the sternum as shown on the accompanying drawing. The specimen figured is in the Museum of the Zoological Society of Amsterdam.



Trachea of Grus americana.

THE CANADIAN CRANE.

6.

THE CANADIAN CRANE

GRUS CANADENSIS

PLATE VI.

THE BROWN AND ASH-COLOURED CRANE, Edw. Nat. Hist. B. III. p. 133. pl. 133 (1750).
LA GRUE DE MEXIQUE, Briss. Orn. V. p. 380 (1760).
LA GRUE DE LA BAYE DE HUDSON, Briss. Orn. V. p. 385 (1760).
ARDEA CANADENSIS, Linn. Syst. Nat. I. p. 234 (1766) — Gmel. Syst. Nat. I. p. 620 (1788).
ARDEA (GRUS) MEXICANA, P. L. S. Müll. Syst. Nat. Suppl. p. 110 (1776).
LA GRUE BRUNE, Buff. Hist. Nat. Ois. VII. p. 310 (1780).
BROWN CRANE, Lath. Gen. Syn. III. pt. 1. p. 43 (1785) — Nutt. Man. II. p. 38 (1834).
GRUS PRATENSIS, Bartr. Trav. Florida, pp. 144, 218 (1791) Coues, Checkl. N. Am. B. p. 108 (1882) id. Key N. Am. B. 2nd ed. p. 667 (1884).
GRUS FUSCA, Vieill. Nouv. Dict. d'Hist. Nat. XII. p. 558 (1817).
GRUS POLIOPHÆA, Wagl. Syst. Av. *Grus*, sp. 7 (1827) — Lembeye, Av. Cuba, p. 80 (1850) — Brewer, Proc. Bost. Soc. Nat. Hist. VII. p. 308 (1860).
GRUS CANADENSIS, Temm. Man. d'Orn. p. c [100] (1820) — Sabine in Frankl. Journ. p. 685 (1823) — Richards. in Parry's 2nd voyage p. 353 (1819—20) — Swains. & Richards. Faun. Bor.-Amer. p. 373 (1831) — Temm. Tabl. Méth. p. 91 (1836) — Bp. Consp. II. p. 98 (1854) — Gundl. (nec L.) J. f. O. 1856 p. 339 — Baird, Cass. & Lawr. B. N. Amer. p. 655 (1858) — Brewer, Proc. Bost. Soc. VII. p. 308 (1860) — Walker, Ibis, 1860. p. 167 — Taylor, Ibis, 1862 p. 129 — Gundl. J. f. O. 1862, p. 81 — Blakiston, Ibis, 1863 p. 128 — Dresser, Ibis, 1865, p. 315 — Schleg. Mus. P.-B. *Ralli*, p. 2 (1865) — Gundl. Repert. His. Nat. Cuba, I. p. 347 (1865) — Coues, Ibis, 1866, p. 263 — Brown, Ibis, 1868, p. 424 — Dall & Bannister, Tr. Chicago Acad. I. p. 289 (1869) — Gray, Handl. B. III. p. 24. n°. 10083 (1871) — Coues, Key, N. Am. B. p. 271 (1872) — Tacz. J. f. O. 1873, p. 112 — Lawr. Mem. Bost. Soc. Nat. Hist. II. p. 311 (1874) — Coues, B. N.-West, p. 532 (1874) — Hensh. Rep. Zool. Expl. West of 100th Merid. p. 467 (1875) — Gundl. J. f. O. 1875, p. 293 — Ridgw. Rep. Surv. 40th. Par. p. 611 (1877) — Coues, Bull. U. S. Geol. Surv. IV. p. 646 (1878) — Merrill, Pr. U. S. Nat. Mus. I. p. 165 (1878) — Adams, Ibis, 1878, p. 437 — Mayn. B. East. N. Amer. p. 422 (1879) — Ridgw. Pr. U. S. Nat. Mus. III, p. 202 (1880) — Tegetm. & Blyth, Monogr. Cranes, p. 72 (1881) — Coues, Checkl. N. Am. B. p. 108 (1882) — Bean, Proc. U. S. Nat. Mus. V. pp. 166, 173 (1882) — Baird, Brew. & Ridgw, Water-B. N. Am. I. p. 407 (1884) — Coues, Key N. Am. B. 2nd ed. p. 667 (1884) — Dress. Auk, II. p. 18 (1885) — Murdoch, t. c. pp. 63, 201 — Beckh. t. c. p. 144 — Turner, t. c. p. 157 — Agersborg, t. c. p. 287 — Murdoch, Rep. Polar Exp. Point Barrow, p. 116 (1885) — A. O. U. Checkl. p. 189 (1886) — Turner, Contr. Nat. Hist. Alaska, p. 145 (1886) — Ridgway, Man. N. Am. B. p. 135 (1887) — Nelson, Rep. Nat. Hist. Alaska, p. 94 — Towns. Auk, IV. p. 12 (1887) — Drew, t. c. p. 264 — Merrill, Auk, V. p. 144 (1888) — Warren, B. Penns. App. p. 234 (1888) — Goss, Auk, VI. p. 126 (1888) — Chapm. Bull. Am. Mus. Nat. Hist. III. p. 131 (1890) — Brewster, Auk, VII. p. 89 (1890) — Macfarlane, Pr. U. S. Nat. Mus. XIV. p. 425 (1891) — Sharpe, Cat. B. Brit. Mus. XXIII. p. 256 (1894).
GRUS AMERICANA, juv. Audub. B. Amer. pl. 261, id. Orn. Biogr. III. p. 441 (1835) id. B. Amer. (8vo) V. p. 188 pl. 314 (1842).
GRUS AMERICANA, Gray, List *Grallæ* Brit. Mus. p. 74 (1844), id. Gen. B. III. p. 552 (1845).
GRUS CINEREA LONGIROSTRIS, Temm. & Schl. Faun. Jap. p. 117, pl. 72 (1850) — Sharpe, Bull. B. O. C. I. p. XLIII (1893).
GRUS LONGIROSTRIS, Bp. Consp. II. p. 98 (1854).
GRUS FRATERCULUS, Cass. in Baird, Cass. & Lawr. B. N. Am. p. 656 (1858) — Gray, Handl. B. III. p. 24, n°. 1004 (1871) — Tacz. Bull. Soc. Zool. Fr. I. p. 246 (1876) — Allen, Bull. Nutt. Orn. Club, V. p. 123 (1880) — Tegetm. & Blyth, Monogr. Cranes, p. 78 (1881) — Ridgw. Pr. U. S. Nat. Mus. III. p. 202 (1881) — Bouc. P. Z. S. 1883, p. 461 — Bogd. Consp. Av. Imp. Ross. p. 107 (1884).
GRUS MEXICANA, Ridgw. Pr. U. S. Nat. Mus. VIII. p. 356 (1885) — Everm. Auk, III. p. 91 (1886) — Anthony, t. c. p. 164 — A. O. U. Checkl. p. 139 (1886) — Ridgw. Man. N. Am. B. p. 135 (1887) — Beckh. Pr. U. S. Nat. Mus. X. p. 637 (1887) — Cooper, Auk, IV. p. 86 (1887) — Lloyd, t. c. p. 185 — Merrill, Auk, V. p. 144 (1888) — Everm. t. c. p. 348 — Scott, Auk, VI. p. 152 (1889) — Pinder, t. c. p. 312 — Cory, B. West Ind. p. 251 (1889) — Mearns, Auk, VII. p. 51 (1890) — Thomps. Pr. U. S. Nat. Mus. XIII. p. 491 (1890) — Merriam, N. Am. Fauna, n°. 3. p. 88 (1890) et n°. 5. p. 90 (1891) — Brewst. & Chapm. Auk, VIII. p. 137 (1891) — Wayne, t. c. p. 308 — Lawr. Auk, IX. p. 42 (1892) — Scott, t. c. p. 312 — Attwater, t. c. p. 232 — Cory, Cat. West Ind. B. p. 90 (1892) — Sharpe, Cat. B. Brit. Mus. XXIII. p. 254 (1894).

GRUS SCHLEGELII, Blyth, Field, XLII. p. 419 (1873) — Tegetm. & Blyth, Monogr. Cranes, p. 78 (1881).
GRUS CANADENSIS β MEXICANA, Baird, Brew. & Ridgw. Water-B. N. Am. I. p. 407 (1884).
GRUS CINEREA, Seebohm (nec Meyer & Wolf) B. Jap. Emp. p. 348 (1890).

Vernacular names. The Canadian Crane or the Sandhill Crane (English); de Canadeesche Kraanvogel (Dutch); der Canadische Kranich (German); la Grue du Canada (French).

Adult. General colour grey, lightest and ranging into bluish grey on the neck. Feathers of breast, and upper wing coverts with lighter grey margins and slightly tinged with brownish. Primaries blackish with light shafts, secondaries dark grey, the inner ones grey, slightly tinged with brownish like the back and slightly falcated, but not decomposed. — Tail feathers slaty grey. Feathers beneath the eye, cheeks and throat white — the feathers of the cheeks towards the ears generally a little lengthened and raised. — Bill greyish horn colour. — Crown of head devoid of feathers, granulated and bluish pink: naked part extending backwards till below the eyes and meeting a more or less visible pointed projection of the feathers of the nape. — The naked skin is sparsely covered with a few black hairs. — Iris brownish yellow.

Legs blackish. (Living birds in Zool. Garden at Amsterdam). Size of *largest* specimen in Leiden, wing 21′, tail 7′, tarsus 10¼′, middle toe & claw 3⅜′, culmen 6′. *Smallest* specimen in Leiden, wing 19′, tail 6½′, tarsus 7½, middle toe & claw 3′, culmen 4¼.

Immature. Similar to the adult but the head feathered and the whole of the plumage, especially of the upperparts, mixed with rusty brown. (Skin in the British Museum from Tarpon Springs Florida).

Chick. Yellowish brown; lighter (shading into white) on the underparts, darker (approaching chestnut brown) on the back and across the wings. — (Chick in British Museum from de Soto Country Florida).

Egg. Figured of the natural size plate XVII nº. 4 from a specimen laid in the Zoological Garden of Amsterdam.

Hab. North America, south to Mexico.

This Crane (for which I retain the name "*canadensis*" of Linneus) has been the subject of much controversy; chiefly attributable to the great difference in size which occurs between various individuals. This variation in size, joined to its extended distribution, has caused it to be divided into two species, which are usually called *Grus canadensis* and *Grus mexicana*, *Grus mexicana* being the larger and *Grus canadensis* the smaller form. As, however, this difference in size is the only reason that has been given for the division, and as I have found, by careful measurements of a number of specimens, that there is a regular graduation in this respect, I cannot agree to it. On measuring carefully the tarsi of a series of specimens I find the following variations in their respective lengths: 7 inches (Brit. Mus.), 7½ (Leiden), 7¾ (Brit. Mus.), 8 (Brit. Mus.), 8¼ (Leiden), 8½ (Brit. Mus.), 8¾ (Zool. Soc. Amsterdam), 9 (Leiden), 9½ (Zool. Soc. Amsterdam), 10¼ (Leiden). I therefore do not find sufficient reasons for recognizing two species [1]). Generally, however, the birds which are resident and breed in the south of North America are larger than those that breed in Arctic America and winter in the south. But large specimens have also been occasionally obtained in the north (as for instance a specimen from Hudson's Bay described by Sabine (appendix to Franklin's Journey) which was upwards of four feet in length.

The Canadian Crane was first figured and described in Edwards "Natural History" as the *Brown and Ash. coloured Crane*' from a specimen brought from Hudson's Bay by Mr. Isham, who says it is found there in summer only. Brisson described it both as *La Grue du Mexique* and as *La Grue de la Baye de Hudson* from Arctic North America, but Linneus in 1766 restored the unity of the species and gave it the name of *canadensis*.

Audubon and Wilson seem not to have identified this species at all, but to have considered it simply to be the young of *G. americana*, to which in fact it bears only a very slight resemblance, *G. canadensis* being *grey*, more or less washed with brown, according to the age, whilst the young of *G. americana* is cinnamon brown, more or less mixed with white, but always without grey. Since that time the difference in size has constantly given rise to disputes as to its division into several species, for which new names (as for instance *Grus fraterculus*, for very small specimens) have been adopted and subsequently rejected.

Grus canadensis in all its different variations in size has a very extended distribution, as it occurs all over northern North America from Alaska to Hudson's Bay, and was even met with as far north as Pond's Bay on the west coast of Baffin's Bay in Lat. 72° during one of the Franklin Relief Expeditions in 1857. It extends all over the United States,

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1) On this subject see Dr. T. M. Brewer in Baird, Brewer & Ridgway's "Waterbirds of North America" I, p. 407 (1884). Dr. Brewer writes: "In this species there "is a vast amount of individual variation in both proportions and colours, especially in the former, scarcely two specimens being approximately alike in all their measurements. "The shape of the bill also varies greatly as does also the appearance of the naked part of the head. Although we have not yet been able to find specimens which were not "positively the one form or the other, we consider it very probable that the two races, distinguished as *mexicana* and *canadensis* (by J. A. Allen and Ridgway in the "Bulletin "of the Nuttall Ornithological Club" for April 1880 (p. 123) and for July 1880 (p. 187) where it is stated no intermediate length of tarsus is found between 6.70—8 for "*G. canadensis* and 9.50—10 for *G. mexicana*) will yet be found to intergrade, since we have been wholly unable to discover any difference between them except size".

chiefly, but not exclusively, west of the Mississippi, south to Mexico and eastwards along the coasts of Florida and Georgia, to Cuba. I may add that it is now rare along the Atlantic coast, north of Georgia and Florida, although it was numerous there in early colonial days [1]). It seems to wander occasionally into eastern Siberia, where it has been recorded by Taczanowski, whilst Temminck in his 'Fauna Japonica' described and figured a specimen from Japan — now in the Leiden Museum — under the name of *Grus cinerea longirostris*.

The breeding-range of this bird extends all over northern North America, from the Arctic Sea and Alaska to the Dominion of Canada, including Baffin's Land, except the country east of Hudson's Bay where I find no account of its occurrence. It also breeds in Dakota, Montana, Minnesota, Iowa and Illinois, in which last State it was observed in July by Major Long. Further south it has been found breeding in Florida and Cuba, where it is said to be resident, and it seems to nest occasionally in Southern Texas as Mr. Dresser was informed. To the west of the Rocky Mountains Dr. Cooper mentions it is a summer resident in Washington Territory, and Capt. Bendire found it a common breeding bird as well in the low lands as in the highest mountain-valleys of Oregon. A few pairs are reported to breed near Mormon Lake in Utah, also in California on the high mountain meadows. In former days it seems to have bred in Pennsylvania (Vieill. Nouv. Dict. XII, p. 558, (1817)).

The result of these observations is that the 40th parallel seems to form about the southern limit of the *regular* breeding range of the Canadian Crane, whilst their breeding in Cuba and Florida must be regarded as more or less abnormal, in the same way as is the breeding of *Grus cinerea* in some parts of Southern Europe.

In Arctic America these Cranes breed about the middle of the month of June. The further they go to the south the more this date is anticipated. Capt. Blakiston found them breeding in the beginning of May in the Saskatchewan plains, whilst in Cuba and Florida the end of Januari or February is the beginning of the breeding season.

According to circumstances, the eggs, which are usually two in number, are either deposited in a slight depression on a sandy beach without any lining (as was the case for instance with those found by Dall and Bannister on the Yukon River, Alaska), or in a depression thickly lined with dry grasses, as recorded by Macfarlane (Pr. U. S. Nat. Mus. XIX. p. 425, 1891). If, however, the nest is made in swampy ground, or even in shallow water, a considerable heap of material consisting of aquatic plants is raised by the parent birds. On the top of this heap a depression is formed, which is carefully lined with fine dry grasses, so that the eggs may be well out of the water.

Mr. Moore describes a nest of the last description which he observed in Florida as follows. — "In one instance a "large mass of aquatic plants was heaped up, constituting a nest which, when found on the 2nd March, was six or eight "inches above the water in its highest parts. It was about a hundred yards from dry ground in the midst of mud and "water and 200 yards from a travelled road and in full view. The sitting bird had lowered her head and so remained "until I was within sixty yards, when she flew off and dropped down among some plants not very far off. The male "soon appeared and continned to fly around but did not come near. The nest contained two eggs."

Although generally selecting low grounds in which they can find marshes and thin woods for their nesting places these Cranes occasionally resort to high mountain-valleys and alpine meadows for the same purpose. Thus for example in South East Oregon and in California they were found nesting in such places by Capt. Bendire and by Dr. Newberry.

The female is supposed to incubate, and to be only watched by the male, but, as in the case of all the Cranes that I have observed during the breeding-period both sexes incubate, I suppose it will be the same with the present species. After an incubation of about thirty days, the two downy young are born and are very carefully led about by the parents, who feed them from their bills with worms and small insects. It is said that if the young are pursued before they can fly, the parents try to draw off the attention of the pursuer whilst the young squat and hide away under a scrub. If the young are caught, the old birds do not venture to attack the offender but utter a peculiar note of alarm (*Moore*). The young are easily reared by hand, and are often kept as pets by the Indians. They live with their parents until they are a year old, after which time they have to look after themselves.

The Canadian Cranes leave their breeding-quarters in Arctic America at the end of August and the beginning of September, and travel southwards in large flocks chiefly by night and often in company with the American Crane. One of the principal routes seems to be the valley of the Mississippi, down which they travel through Texas into Mexico to pass the winter. A second route is along the Rio Grande the course of which they may be seen to follow every autumn, as is recorded by H. W. Henshaw, whilst the most western route is across Oregon and California between the Rocky Mountains and the Sierra Nevada, along the Rio Colorado. Here Dr. Newberry observed their first arrivals in September. "They came in thousands, flock succeeding flock, flying along the course of the river in Indian file. He further remarks "that each bird keeps its place in this long line, and that the whole column falls or rises according to the security the "ground passed over seems to give. Swaying to the right and left, the whole line in the hazy distance becomes like an

1) Brewster, Auk. VII, p. 89.

"immense serpent gliding mysteriously through the air." In California and Texas the birds apparently linger for some time, but the greater part have reached Mexico by the month of November, although the first arrivals there, according to Lawrence, are as early as September. According to Henshaw they also winter in large numbers in New Mexico between Fort Craig and Albuquerque, where he observed them in November in large flocks. Dresser records this Crane as common in the winter near San Antonio in Southern Texas.

Contrary to the habits of the greater part of the Canadian Cranes, which perform an annual migration from their breeding quarters in the north to the south of the continent, the birds of this species which are found in Cuba and Florida appear to have lost this habit and to have become permanent residents in those countries

It is rather remarkable that both Florida and Cuba seem to be out of the way of the flocks of migrating Cranes that annually resort to the south. Moore observes that in Florida the number of Cranes does not increase in winter. Perhaps the fact of being out of the way of the migratory flocks, is the very reason for the Cranes having become permanently resident in these countries. Some pairs may have accidentally arrived there in former times, found the country suitable, and bred there, and, as there was no reason for leaving, may have resisted the migrating impulse and become permanent inhabitants.

The Canadian Crane in its winterquarters lives in flocks along the rivers, in swamps and in the fields in very much the same way as the American Crane, and in March begins to leave for the north. They mostly travel northwards through the interior of North America. Only a few pass over California along the west coast, where they were observed at Gray's Harbour, Washington, flying in a flock of about twenty on the 20th April (Lawrence, Auk. IX. p. 42 (1892)). Anthony (Auk. III. p. 164 (1886)) also speaks of the Sandhill Crane as a rare spring migrant in Oregon, although it is common enough in autumn.

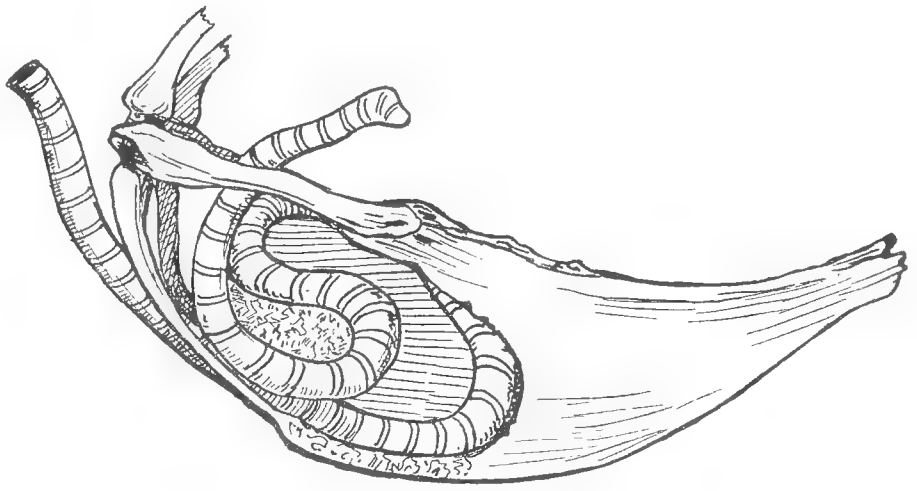
On the Saskatshewan Capt. Blakiston observed large flocks of this Crane coming from the south in April. Dawson saw it arrive near Dufferin, Manitoba, between the 25th and 30th April. Kennicote met with this species at Fort Resolution on May 30th, and Macfarlane found it breeding in June on an island near Franklin's Bay, so that it had evidently arrived there in May. It is probable, therefore, that even the most northern limits of its breeding range are reached by the end of May or beginning of June.

In their breeding quarters the Sandhill Cranes never nest in community, but each pair has a particular district which it keeps as much as possible free from the intrusion of its fellows.

The first living Cranes of this species arrived in the Zoological Gardens of London in 1866, but the Zoological Garden of Amsterdam were able to exhibit an example of this bird as early as 1851, and since that time have shown specimens nearly every year. As is the case with the American Crane, Mr. Charles Reiche of Alfeld is one of the animaldealers of the continent by whom they are chiefly imported. They are much more usually to be had than the American Crane.

These birds live well in confinement and those in the Gardens of the Zoological Society of Amsterdam have often laid eggs, although young ones have never been hatched.

The figure of the trachea of *Grus canadensis* is an enlarged copy of that given in Coues Key N. Am. Birds fig. 100, pag. 203.



Trachea of Grus canadensis.

THE SARUS CRANE.

7.

THE SARUS CRANE

GRUS COLLARIS

PLATE VII, VIIa.

LA GRUE A COLLIER, Buff. Hist. Nat. Ois. VII. p. 307 (1780) — Daubent. Pl. Enl. VIII. p. 157 pl. 865 (1783).
INDIAN CRANE, var. *α*. Lath. Gen. Syn. III. pt. 1. p. 39 (1785).
GRUS COLLARIS, Bodd. Tabl. Pl. Enl. p. 52 (1783).
ARDEA ANTIGONE var. *β* (GRUS TORQUATA), Gm. Syst. Nat. I. p. 622 (1788).
GRUS TORQUATA, Vieill. Nouv. Dict. d'Hist. Nat. XIII. p. 560 (1817) id. Gal. Ois. II. p. 142 pl. 256 (1825) — Wagl. Syst. Av. *Grus*, sp. 11 (1827).
GRUS ORIENTALIS, Franklin, P. Z. S. 1831, p. 123.
GRUS ANTIGONE (nec Linn.) Sykes, P. Z. S. 1832, p. 157 — Nordm. in Démid. Voy. Russ. Mérid. p. 265 (1840) — Jerdon, Madras Journ. XI. p. 194 (1840) — Reichenb. Handb. Fulic. pl. CXXIX. figs 1235—1240 (1852) — Irby, Ibis, 1861, p. 242 — Jerdon, B. Ind. III. p. 662 (1864) — Schleg. Mus. P.-B., *Ralli*, p. 3 (1865) — Huxley, P. Z. S. 1867, pp. 430, 457 — Beavan, Ibis, 1868, p. 391 — Gray, Handl. B. III. p. 24, n°. 10090 (1871) — Garrod, P. Z. S. 1873, pp, 469, 640 — Hayes Lloyd, Ibis, 1873, p. 416 — Hume, Nests, & Eggs Ind. B. p. 584 (1873) id. Str. Feath. I. p. 234 (1873) — Adam, t. c. p. 395 — Ball, Str. Feath. II. p. 430 (1874) — Butl. Str. Feath. IV. p. 14 (1876) — Garrod, P. Z. S. 1876, p. 277 — Ball, Str. Feath. VII. p. 227 (1878) — Hume, Str. Feath. VIII. p. 112 (1879) — Scully, t. c. pp. 352, 368 — Butl. Cat. B. Sind, Cutch, etc. p. 60 (1879) — Hume & Marh. Game-B. Ind. III. p. 1 pl. I (1880) — Tegetm. & Blyth, Monogr. Cranes, p. 47 (1881) — Reid, Str. Feath. X. p. 67 (1881) — Davidson, t. c. p. 319 (1882) — Simson, Ibis, 1882, p. 93 — Forbes, P. Z. S. 1882, p. 352 — Murray, Cat. B. Sind, p. 235 (1884) — Radde, Orn. Caucasica p. 391 (1884) — Swinh. & Barnes, Ibis, 1885, p. 133 — Oates & Hume's Nests & Eggs Ind. B. III. p. 372 (1890).
GRUS TORQUATA, Gray, List *Grall.* Brit. Mus. p. 75 (1844), id. Gen. B. III. p. 552 (1845) — Reichenb. Handb. Fulic. taf. CXXVII. fig. 428 (1852).
ANTIGONE ANTIGONE, Bp. Consp. II. p. 100 (1854).
ANTIGONE TORQUATA, Reichenb. Handb. Spec. Orn. p. XXIII. (1852) — Bp. Compt. Rend. XXXVIII. p. 661 (1854) — Gray, Cat. Mamm. &c. Nepal Pres. Hodgson, p. 71 (1863).
ANTIGONE COLLARIS, Sharpe, Cat. B. Brit. Mus. XXIII. p. 262 (1894).

Vernacular names. The White-collared Crane (English); de Ringkraan (Dutch); la Grue à collier (French); der Halsband Kranich (German); Saras (Indian).

Adult. General colour nearly uniform bluish grey. Primaries darker grey, outer secondaries ashy grey on the outer webs, lighter on the inner. Inner secondaries slightly elongated and lanceolate but *not* decomposed, and almost pure white, like the greater coverts which are, however, a little more grey. Neck all round below the featherless portion, pure white forming a broad collar. Head and upper part of neck devoid of feathers except at the ears which are covered by a patch of ashy grey feathers. Skin on forehead and crown naked and of a pale ashy green. Rest of head, and featherless part of neck scarlet red and papillose. Upper throat down to about halfway the naked part of it, densely covered with black hairs, so as to form a short beard which is especially prominent in the male. Iris brownish yellow. Bill greenish horn colour. Legs bluish pink. (From a living bird in the Zoological Gardens of Amsterdam). Wing 27′, tail 9½′, tarsus 12½′, middle toe & claw. 5¼, culmen 6¾′, (specimen in the Leiden Museum).

Immature. Brownish grey, edges of feathers, especially those of the upper parts cinnamon brown, the down still adhering to the feathers. Head and upper part of the neck, which are naked in the adults, covered with brown feathers. At this stage the tarsus, which is about 13 inches in length in the adult is only 9 inches long. (The figure plate VII*a* is from a specimen in the Leiden Museum).

Chick. Closely resembling the Chick of *Grus antigone.* —

Egg: An elongated oval, usually a good deal pointed towards the one end. Shell very hard and strong, generally fairly and sometimes highly glossy, very rarely almost devoid of gloss. Shell pitted more or less distinctly, ground colour sometimes pure white, sometimes clear pale sea-green, in others a sort of pinky cream colour and numerous intermediate shades are observable. Some few eggs are entirely spotless and devoid of markings, but they are commonly more or less profusely studded with blotches and clouds of pale yellowish brown purple or purplish pink. As a rule the markings are most numerous at the large end and sometimes even are entirely confined to that part of the egg. The size of the eggs varies very much, the average of fifty-one eggs is 3.96 by 2.56 inches. Greatest length observed 4.48 inches, greatest breadth 2.75 inches. *(Capt. G. F. L. Marshall).*

Hab. Northern India.

This is the "Sarus Crane" of India proper, the "*Grue à collier*" of Buffon and the "*Grus collaris*" of Boddaert. Buffon tells us that a bird of this species had been kept alive by Madame de Bandeville, and gives us a very good figure of it, in which the white collar is quite conspicuous, the only fault to find with it being that the tertiaries should be lighter in colour. Vieillot in his "Galerie des Oiseaux" figures it again, and gives the tertiaries their proper tint. As regards the further history of this bird, it has been constanty confounded with its near relation the Sarus Crane of the Burmese peninsula *(G. antigone).* I might as well mention that all the birds of this species with white collar and white tertiaries to be found in the British Museum come from India proper and Nepal, and that the same thing is the case in the Paris Museum, where M. Oustalet was kind enough to examine the specimens at my request.

The Collared Crane inhabits the northern part of India, north of the 20th parallel, extending to the Himalayas on the north, east as far as the neighbourhood of Dacca in Upper Bengal, and west up to the Indus. Over the greater part of the country named, the bird breeds in suitable localities, that is, in swampy plains and in the neighbourhood of rivers and lakes. Although it has been stated otherwise, most observers agree that this bird is very partial to watery plains, being seldom found very far from swamps, lakes or rivers. In the rainy season during which this Crane breeds, it is scattered in pairs all over its breeding range, being found particularly numerous in Upper Bengal, in some parts of Nepal, and in the North-Western Provinces. It also occurs in Oudh, in some parts of the central Provinces, North-eastern Rajputana, Cutch and Kathiawar in Western India. In the western part of the Punjab, in Rajputana and in Sind this bird becomes rarer, and its occurrence so far west as the western shore of the Caspian Sea (recorded by Nordmann and by Radde) must be regarded as exceptional. So also the birds seen by General A. W. Komarow at Derbent, as recorded by the last-named author, must be deemed to be stragglers. On the eastern coast of India, this Crane may be met with sparsely as far south as the Godaveri *(V. Ball).*

In Hume and Marshall's "Game-Birds of India" we find an excellent account of the habits of this bird given as follows: — "In the above-named well-watered districts this Crane is found generally in the neighbourhood of cultivation, "but it may be found far away from this, in places where wide level plains are watered by streams or rivers or dotted "about with ponds or lakes. During the autumn and cold season most of the pairs are accompanied by one, two or "rarely three young ones over whom they watch with great solicitude. These birds certainly pair for life and palpably "exhibit great grief for the loss of their mate, keeping for weeks at times about the locality where their partner was "killed and calling constantly. Generally after a week or ten days the survivor disappears, and, it is to be hoped finds "consolation elsewhere with a new mate; but on two occasions I have actually known the widowed bird to pine away "and die; in the one case my dogs caught the bird in a field, where it had retreated to die, literally starved to death; "in the other the bird disappeared, and a few days later we found the feathers in a field where it had obviously fallen "a prey to the jackals. In both these cases I had killed the bird by accident shooting at other things". This agrees with what Mr. R. M. Adam has told us about the conjugal fidelity of this Crane. He says that in Rajputana the people object to its being shot, and that "they look upon the killing of the pair as a lesser sin than the killing of one. Should "one of a pair be killed the native belief is that the surviving bird calls all the long night for its mate, and beats its "head on the ground until it dies". Speaking of the protection this bird enjoys from the natives, Jerdon informs us that "in most parts of the country it is so confiding and fearless in its habits as to preclude the sportsman from shooting "it, and in the territories of Holkar it is, if not venerated, esteemed so highly as to be held sacred from the Shikaries, "and I have known complaints made against officers for shooting it".

Hume informs us that "when the young are only half grown the old birds are still seen feeding them". Further on Mr. Hume says "although the young often keep with them till March they do not feed them, though they still call "them and warn them if any suspicious objects appears. Later in spring the pair may be seen standing side by side in "the shallow water pluming and fondling each other most affectionately. In their wild state amongst themselves they

THE SARUS CRANE, IMMATURE.

"appear to be most gentle, loving creatures. They rise from the ground after taking a run of some yards before getting "on the wing, the heavy strokes of their powerful pinions resounding. Once on the wing their flight is very strong, and "is continued often for several miles, but they never, so far as my experience goes fly at any great height above the "ground. I observed a pair that every day flew through a distance of about 5 miles backwards and forwards to a piece "of water but never rose above twenty yards from the ground. I do not think that they ever in India rise high in the "air and circle around as other Cranes do. They seldom fly except when it is absolutely necessary and I saw them "walking a couple of miles over a grassy meadow to a piece of water. If there are trees or cover on their way they "fly, probably because they do not feel certain that some enemy may not be lurking behind them. Their call is very "loud and sonorous, they always call when alarmed and at night when the darkness hides them from each other, to "make sure that their mates are there. They feed on frogs, lizards, small reptiles, insects, snails, and other land and "water shells, seeds, grains and small fruits of various kinds, green vegetable matter and bulbous roots of various species "of aquatic plants".

The Collared Crane breeds in India in the rainy season, beginning to make its nest at the end of June, and laying its eggs in the same month, also in July, August and September. Irby found eggs in Oudh in the month of June, Capt. G. F. L. Marshall took eggs near Bolundshahr on the 25th July, in the Muttra district on the 29th August, and in the Aligurh district on the 8th September, whilst Adam found eggs on the 23rd August near Sambhur Lake in Rajputana. The breeding as late as September must be considered as unusual, and generally due to the birds having been deprived of their first clutch. These birds pair for life and, like most Cranes at that period, are very interesting when courting. The pair go through the most wonderful performances of jumping, dancing, and bowing. Hume informs us that the nest is constructed "on some firm spot in the midst of the largest jhil or swamp that they can find, not always on "an island, for they often build on sites completely overflown, but on some spot that would be an island if the water "fell eight or ten inches. The nest is a huge heap, a broad truncated cone, composed of reeds and rushes and straw, "varying much in size according to situation and circumstances. At the top it is about 2 feet in diameter with a central "depression, from four to eight inches deep, for the eggs. If, as is commonly the case, the nest is placed in water the "bottom of the egg-cavity will be from eight to twelve inches above the surface of the water, and with from three inches "to two feet of nest below the water. On more than one occasion when in sudden and heavy falls such as we get in "India, six and eight inches of rain falling within twelve hours, the jhils were rising very rapidly, I have seen the birds "very busy raising their nests. One nest that had been raised I measured a couple of months later, when the ground "on which it stood was dry and found it to be fully nine feet in diameter at the base and three feet in height and it "must have lost at least a foot by settling. When built on land surrounded but not overflowed with water, the nest is "a much less pretentions affair perhaps 5 feet in diameter at the base and a foot only in height. Occasionally apparently "where they could not get a large enough piece of water to secure as they considered their safety, I have found them "seeking this in concealment. As a rule the nest is out in the open, visible from all directions at a miles distance. In "the few cases to which I refer I have found it in dense beds of bulrush and reed so lofty that even when standing on "its nest the bird was only to be seen by climbing a neighbouring tree. In these cases the rushes and reeds, where they "were thickest had been bent down across and across so as to form a platform five or six feet in diameter and on this "a comparatively slight nest had been constructed.

"Two is certainly the normal number of eggs, but I have twice (out of more than a hundred nests) found three "and I have occasionally seen three young birds in company with an old pair.

"I remember one day, as I was coming home from Rahun, I saw in a sheet of rain water some distance off the "road a Sarus sitting on her nest and the male standing beside her. I rode as near the place as I could and then sent "my syce to get the eggs. As he commenced wading towards the nest the male began to dance about, flapping his "wings and trumpeting most bravely; but when the man had got within a few yards and landed safely on the patch of "dry ground on which the nest rested, the male put his head down and ran off very crestfallen to a ridge in the water "some fifty yards distant, whence he began with loud cries to encourage his lady not to allow 'that black rascal' to take "any liberties. She sat quite still, neither moved nor cried, only as the man came close to her made such vigorous pokes "and drives at him that he got frightened and was picking up a great dry branch to strike her with, when I called out "to him to flap her in the face with his waist cloth. This he did vigorously, and this being more than she could endure "she reluctantly crept off the nest, now complaining loudly, and joined the male. There was only one egg; this the man "brought, but before he could reach me the female had regained the nest, and after minutely examining it and making "certain the egg was gone, she stood up on the top and with bill, legs and feet commenced throwing the straw about "in the air in the most furious manner as if beside herself with rage. Then the male came up trumpeting vigorously, but "directly he came near she flew at him and he scrambled off half running, half flapping through the water and making "more noise than ever. By this time I had received the egg, and found the point of the young one's bill protruding, so

"sent the man back with it sharp. As he approached the female ran off, but she must have seen what he was at, for "before (having gently laid the egg in the disordered nest, which he smoothed a little) he could get off the island the "female was down upon the egg, sitting as if nothing had happened, but uttering a low chuckling sound such as I had "never heard before. But the real joke was to see the male, the moment he had perceived that the coast was clear and "that his mate was again sitting, he came back to the nest and paraded round and round, his wings extended, his head "in the air, trumpeting loudly, clearly wishing her to believe that it was all his doing.

"I have heard many stories of these birds showing fight in defence of their *penates*, but this was the nearest "approach to anything of the kind I ever witnessed, and as a rule both birds run away directly you get within twenty "yards of the nest.

"With dogs it is different, and I have seen a large water retriever so buffeted and scratched, and cut in two "minutes, that he was fain to make off at his best pace howling and yelping, and I have no doubt that foxes and jackals "would fare equally ill."

I find no exact information about the time of incubation of this Crane, but think it probable 30 days will be about the duration of it.

The young chicks are more or less shaky on their legs during the first day or two and are most tenderly nursed and fed by the parents who present the young birds with every small thing they think suitable for food. The chicks grow very fast and when half grown are still fed by the parents although they certainly at that time feed themselves as well. The young birds remain with their parents until the following March by which time they are quite capable to look out for themselves.

The Collared Crane is not a migratory bird but a permanent resident in the places which it frequents. However, during the cold dry season old and young birds often collect in flocks, and Adam saw as many as thirty young and old feeding together in the Sambhur Lake district, in Rajputana. Even in these flocks the families, consisting of male and female with their young ones, constantly keep together, and the gatherings are more to be attributed to the fact that the birds are driven by drought from their usual haunts and resort to the only places where water is to be found and thus necessarily come together, than to any social instinct.

During the dry weather the birds also appear in the Deccan in flocks, according to Sykes, and in all parts of India, where they are found only occasionally, it is always during the drought.

The Zoological Gardens of Amsterdam received their first specimen of this Crane in 1850. According to the List of the Animals of the Zoological Society of London their first specimen of the Collared Crane was acquired in March 1877. In France, as recorded by Buffon, Madame de Bandeville had a living specimen of this Crane in the middle of the 18th century. At the present time Collared Cranes are constantly exhibited in the different Zoological Gardens of Europe. In the Amsterdam Zoological Gardens for example they live for years, keeping always in splendid condition. This good condition is necessary to make evident their specific difference from *Grus antigone*, as it is only in fully adult, perfect and clean-feathered birds of this species that all the characters, that is, the thick black beard of the male, the white neck-collar and the light tertiaries are conspicuous.

This bird is said to have bred in confinement in India but I have no evidence of this having happened in Europe.

The trachea of this species closely resembles the one of *Grus antigone.*

THE EASTERN SARUS CRANE.

THE EASTERN SARUS CRANE

GRUS ANTIGONE

PLATE VIII.

THE GREATER INDIAN CRANE, Edw. Nat. Hist. B. I. p. 45, pl. 45 (1743).
LA GRUE DES INDES ORIENTALES, Briss. Orn. V. p. 378 (1760).
ARDEA ANTIGONE, Linn. Syst. Nat. I. p. 142 (1760) — Gmel. Syst. Nat. I. p. 622 (1788).
INDIAN CRANE, Lath. Gen. Syn. B. III. pt. 1. p. 38 (1785).
GRUS ANTIGONE, Vieill. Nouv. Dict. d'Hist. Nat. XIII. p. 560 (1817) — Wagl. Syst. Av. *Grus*, sp. 10 (1827) — Gray, List *Grallæ* Brit. Mus. p. 74 (1844) id. Gen. B. III. p. 552 (1845) — Beavan, P. Z. S. 1867, p. 762 — Blyth, B. Burmah, p. 157 (1875) — Oates, Str. Feath. V. p. 164 (1877) — Wardlaw Ramsay, Ibis, 1877, p. 469 — Hume & Davis. Str. Feath. VI. p. 458 (1878) — Anderson, Zool. Results Exped. Gunnan, 684 (1878) — Hume, Str. Feath. VIII. p. 112 (1879) — Davis. in Hume & Marsh. Game-B. Ind. III. p. 5 (1880) — Oates, Str. Feath. X. p. 238 (1882) — id. Handb. B. Brit.-Burm. II. p. 354 (1883).
ANTIGONE ANTIGONE, Bp. Consp. II. p. 100 (1854) — Sharpe, Cat. B. Brit. Mus. XXIII. p. 264 (1894).
GRUS (ANTIGONE) SHARPII, Blanford Bull. B. O. C. XXX, p. VI (1895) [1]).

Vernacular names. The Eastern Sarus Crane (English); de Indische Kraanvogel (Dutch); la Grue Antigone (French); der Antigone Kranich (German).

Adult. General colour bluish grey, and on the whole, closely resembling that of *Grus collaris*, only the white collar below the featherless part of the neck is wanting, and the inner secondaries are not white, but grey like the rest of the body. A few black hairs at the base of the bill and the throat, but not nearly so many as in *G. collaris*. The size is usually a trifle smaller than that of *G. collaris*.

Immature. Similar to the immature of *Grus collaris*, judging from a skin in the British Museum, from Penang.

Chick. Yellowish brown buff, darker on the upper parts.

Egg. Figured of the natural size plate XVII nº. 5 from a specimen laid in the Zoological Garden of Amsterdam.

Hab. Burmah, Siam, and Malay Peninsula.

This is the Sarus Crane of the Siamese Peninsula and adjoining countries and although it has often been denied specific rank, the fact that all the birds from this quarter perfectly answer the description of it given above, whilst all the birds from India proper may be referred to *G. collaris*, make me quite agree with Dr. Bowdler Sharpe in keeping the two forms separate.

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1) With all due respect to Dr. Blanford's great authority I am not convinced that Edward's figure of the greater Indian Crane is necessarily to be attributed to *Grus collaris*. I therefore prefer to follow the ordinary practice of calling the present bird *Grus antigone*, and not *Grus sharpii*.

In Zoological Gardens and in the dealers' shops this bird is generally overlooked (besides that it is less often imported) and is considered to be a badly feathered or immature stage of *G. collaris*. But if birds of both species in good condition and in adult dress are compared, the differences are obvious at all seasons. The Burmese birds never acquire at any age or in any season the white inner secondaries and the white neck-ring of *G. collaris*.

This Crane is distributed as a breeding bird over the greater part of the Burmese peninsula in suitable places. Blyth records it from Arrakan and Anderson from Upper Burmah generally. Oates found it common in the vast plains of Lower Pegu; Wardlaw Ramsay and Hume and Davison record it as common in the country between the Sittang and the Salween, and Ramsay mentions it as breeding near Tonghoo. Cantor procured it as far south as the province of Wellesley both in the adult and young dress, and also found it common in Siam.

In the Paris Museum are two specimens (one a male) from Lower Cochin China sent by M. Germain in 1882, and a third specimen from Siam transmitted in 1861 by the Siamese Embassy.

The Eastern Sarus Crane has been found breeding in the months of August and September, and it probably also nests later in the year, as Davison found young birds in Burmah, still unable to fly as late as December. Wardlaw Ramsay, who records its breeding near Tonghoo, tells us that, although he did not find the nest himself, eggs were brought to him by the Burmese. They described the nest as a pile of weeds and mud, situated generally in the midst of a swamp. On the 29th September a Burmese brought him an egg and a newly hatched chick. The man had taken the eggs and placed them in a nest of a species of weaver-bird for safety, but one of the eggs had hatched in transit. The little bird was given into the charge of a common hen with doubts as to the result. She, however, took the greatest care of it, and showed great wrath if anybody attempted to touch it. On the morning of the eleventh day, however, the little creature died. When just out of the shell it devoured worms greedily. Davison found that if the young birds were pursued before they were able to fly they were very cunning in hiding themselves, taking advantage of the slightest shelter. When fairly run down in the open, they lay down, trying to bury their heads in the grass, and make no further attempt to escape. They remain perfectly still even when lifted up in the hand. The female is said to utter loud calls at daylight during the time of incubation standing on the top of her nest, and the best way of finding the nest is to go to a likely place in a canoe before daylight and survey the surrounding ground from a high 'tai' or paddy-grower's hut with a pair of binoculars.

The Burmese object to these birds being shot and have many legends to illustrate the strong conjugal affection of the sexes.

In Burmah these Cranes feed, according to Davison, a great deal on the young paddy plant, and sometimes do considerable damage to the nurseries. He himself never saw them feeding on anything else, although they probably eat other green crops as well, and also frogs and other small animals.

In reverse of the habits of the Collared Crane of India, the Antigone Crane seems to be a migratory bird in some parts of its range. They collect in large flocks and fly at a great height during this season. Dr. John Anderson tells us that in March 1868 and 1875 he saw from his camp, at Ponser in Upper Burmah at an elevation of 3300 feet, large V-shaped flocks of Cranes passing overhead in the direction of the Burmese valley. His attention was first attracted to them by their loud calls overhead, for the birds were so distant as to appear but mere specks. When the flock in advance was right over the summit of the high mountain on the slope of which the camp was pitched, the birds flew round in a great circle and continued doing so, until nine other flocks had come up, when, each flock circling round, commingled with the others. They then marshalled off into two great bands, which again broke up into V-shaped flocks. As they continued their flight about sixty were counted in each flock and as the flocks were nearly of uniform strength there could have been not less than 600 birds.

Davison saw large flocks of these birds of from 8 to 60 in number make their appearance in the neighbourhood of Thatone in Lower Burmah in the beginning of August.

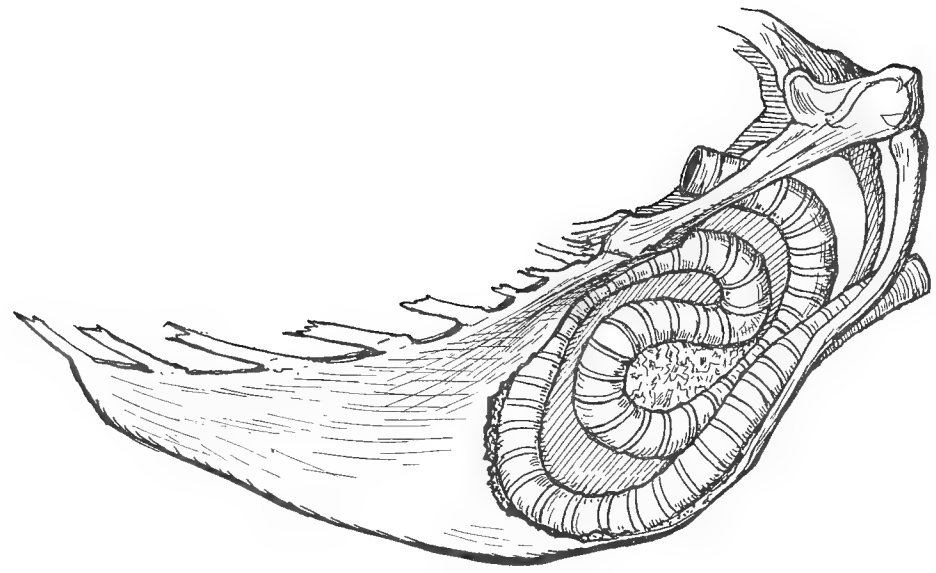
I can find no information about what takes place in Siam and Cochin China, but the above-quoted observations make it probable that, as suggested by Hume, in Burmah this species is to a certain extent migratory and that a number of the Upper Burmah birds go south to near the Gulf of Martaban to breed.

A living bird of this species was probably living in Holland in the 17th century, as we find it represented in one of de Hondecoeters paintings (1636—95) called "het drijvend veertje", along with several other exotic and Dutch birds, including a beautiful *Bernicla ruficollis*. The painting is in the National Museum at Amsterdam.

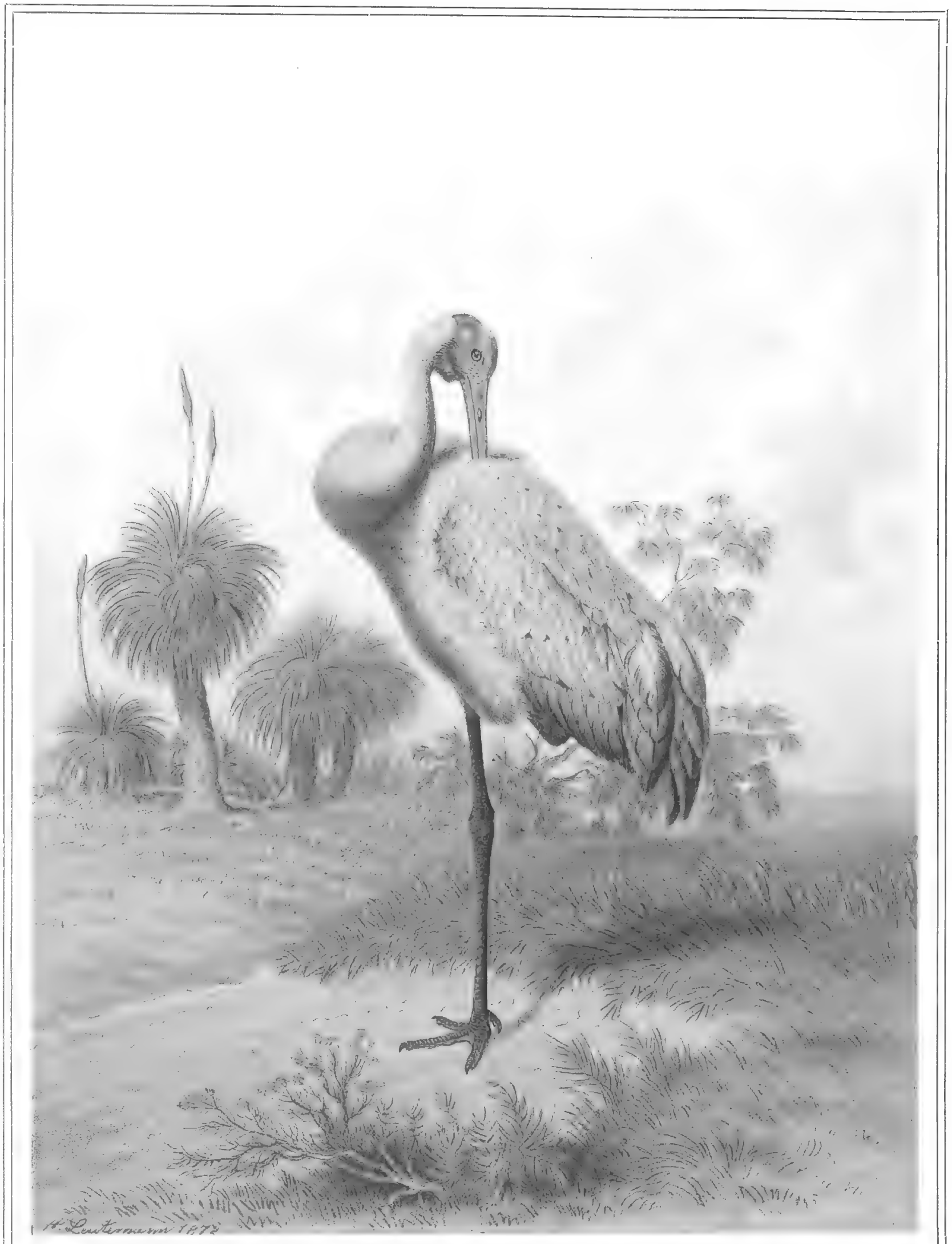
The Zoological Gardens of Amsterdam received their first bird of this species in 1850, whilst the London Gardens obtained it some 15 years later. Edwards, in 1743, wrote that a Crane of this species was kept alive by Sir Charles Wagers, and gave us a picture taken from it. (This plate agrees with this species but in the text the neck-collar is described as white).

This Crane is rare in collections, although a label with the name of this bird is often put on individuals of the foregoing species, which have not been properly identified. In the Zoological Gardens of Amsterdam specimens have lived for a long time, the bird represented on the plate having been there for over 22 years.

The trachea figured belonged to the bird which lived for so many years in the Zoological Garden of Amsterdam and which is represented on plate VIII.



Trachea of Grus antigone.



THE AUSTRALIAN CRANE.

9.

THE AUSTRALIAN CRANE

GRUS AUSTRALASIANA

PLATE IX.

GRUS AUSTRALASIANA, Gould, B. Austr. VI. pl. 48 (1848) — Gray, Gen. B. III. App. p. 25 (1849) — Reichenb. Naturg. Vög. II. p. 338 (1850), id. Handb. Fulic. taf. CCCXLI, fig. 2691 (1852) — Bp. Consp. II. p. 98 (1854) — Schleg. Mus. P.-B., *Ralli*, p. 3 (1865) — Gould, Handb. B. Austr. II. p. 290 (1865) — Gray, Handl. B. III. p. 25, n°. 10091 (1871) — Ramsay, P. Z. S. 1877, p. 340 — Casteln. & Ramsay, Pr. Linn. Soc. N. S. W. I. p. 385 (1877) — Ramsay, op. cit. II. p. 198 (1878) — Forbes, P. Z. S. 1881, p. 644 — Tegetm. & Blyth, Monogr. Cranes, p. 51 (1881) — North, Nests & Eggs Austr. B. p. 314 (1889) — Cox & Hamilton, Pr. Linn. Soc. N. S. W. ser. 2. IV. p. 420 (1890).

ANTIGONE AUSTRALASIANA, Sharpe, Cat. B. Brit. Mus. XXIII. p. 265 (1894).

Vernacular names. The Native Companion (English); de Australische Kraanvogel (Dutch); la Grue d'Australie (French); der Australische Kranich (German).

Adult. General colour bluish grey, feathers of the back and wing-coverts with lighter margins. Primaries black, secondaries grey, the inner ones a little elongated, broadened and bent. Tail-feathers grey, blackish towards the tips. "Crown of head and bill olive-green, the latter becoming lighter towards the tip; iris fine orange yellow; raised fleshy "papillæ surrounding the ears and back of the head fine coral-red, passing into an orange tint above and below the eye, "and becoming less brilliant on the sides of the face, which, together with the gular pouch, is covered with fine black "hairs, so closely set on the latter as almost to conceal the red colouring of the skin; upper part of the pouch and the "bare skin beneath the lower mandible olive-green; a patch of dark ashy feathers covering the ear. In old males the "gular pouch is very pendulous and forms a conspicuous appendage; legs and feet purplish black". (*J. Gould*) wing 24′, tail 8′, tarsus 10½′, middle toe & claw 4′, culmen 6′ (bird in the Leiden Museum).

Immature. I remember having seen an immature living bird of this species in which the head was covered with brownish feathers and the gray of the upper parts was more or less mixed with brown.

Chick. I have not met with a nestling of this species nor a description of it, but I have no doubt that it closely resembles the chick in down of *G. antigone* and *G. collaris*.

Egg. Figured of the natural size plate XVII n°. 6 from a specimen laid in the Zoological Garden of Amsterdam.

Hab. Australia.

The early visitors to Australia did not distinguish this Crane from *Grus antigone* of India, and Gould has the merit of having first recognised it as a separate species and of giving it an appropriate name. This name '*Grus australasiana*' could not have been better chosen, for contrary to the usual fact, that, if a continent does possess Cranes, several species are found in it, Australia can only boast of this one Crane, no other species of the family having as yet been discovered in it either as a resident or as a visitor.

To Gould again we are indebted for the greater part of what we know respecting this fine bird, and also for a beautiful plate of it in his 'Birds of Australia'. Gould tells us that the Australian Crane is abundantly distributed over the greater part of that continent from New South Wales in the south to Port Essington in the north. It has not been observed in the colony of West Australia nor in Tasmania. It was frequently seen by Leichardt during his overland expedition from Moreton Bay; Capt. Sturt states that it is very abundant on the Macquarie River, whilst Gould himself found it numerous in the neighbourhood of the Namoi and on the Brezi Plains in December, 1839. Ramsay found it

plentiful in all the swamps of the Herbert district in Queensland, and states that it occurs on the Norman River, near Rockingham Bay, near Port Denison, in the Wide Bay district, in the Rich and Clar River districts of New South Wales, in the interior of Victoria and in South Australia.

The 'Native Companion', as this Crane is called in Australia, is not a migratory bird in the true sense of the word, and is found breeding in all the above-named districts in suitable places, remaining there nearly all the year round. The breeding season begins, according to North, in September. The nest is placed in a slight depression of the soil on the bare plains; but occasionally the low swampy lands in the vicinity of the coast are resorted to for that purpose. I can find no information about the time of incubation nor about the behaviour of the parents when the chicks have come out, but there is no reason to believe that the species differs in these respects from other Cranes.

Gould saw these Cranes in pairs in suitable localities all the year round, but also noticed them in flocks of from thirty to forty in number. It is probable that these flocks consist of birds driven away from their usual haunts after the breeding season by drought, which in Australia forces many birds that do not migrate in ordinary years, to go away from the interior. It is also possible that they may consist of immature birds, which at the beginning of the breeding season following the one in which they are born, are driven away by their parents, and form small flocks which wander about the country until the birds pair and settle down somewhere else to breed.

The flight of this Crane, when once on the wing, is very powerful. On this subject Gould writes: — "When "near the ground the action of the wings is very laboured; but when soaring in a series of circles at such a height in "the air as to be almost imperceptible to human vision, it appears to be altogether as easy and graceful; it is while "performing these gyrations that it frequently utters its hoarse, croaking cry."

Its food consists of insects, lizards, bulbous roots and various other vegetable substance in search of which it tears up the earth with great facility with its powerful bill.

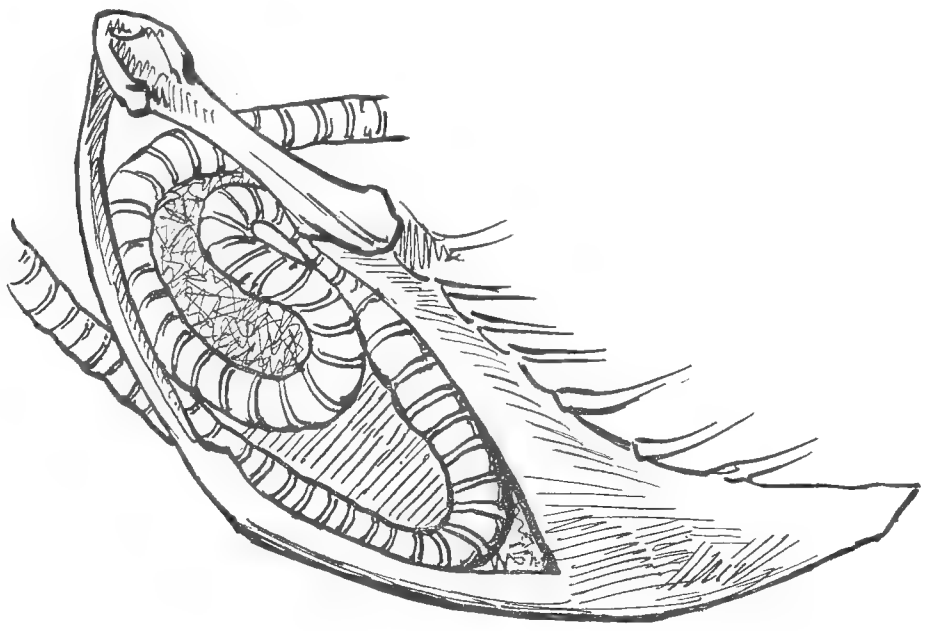
The Zoological Garden of Amsterdam received its first Crane of this species in 1852 and the Zoological Society of London in 1857. Since that time Australian Cranes have almost without interruption been exhibited in both places, and not only in these, but in most of the other Zoological Gardens of the Continent.

In private collections also they are by no means rare. The birds become exceedingly tame, and I remember a beautiful bird of this species in Lord Lilford's possession, which, having the full power of its wings, gave the rare sight of a Crane on the wing in close proximity, as it soared round over the part of the park devoted to the Crane collection. I have also seen another bird of this species in captivity, which, being unable to fly, greeted its master with the most wonderful dances, now and then jumping high up in the air all the time circling round its friend in a most excited way.

Like many Australian birds this Crane thrives well in Europe and does not fear the cold of our winters, but I know no instance of its having bred in captivity.

The trachea of this species resembles that of *Grus antigone.*

The specimen figured is in the Museum of the Zoological Society of Amsterdam.



Trachea of Grus australasiana.

THE DEMOISELLE CRANE.

10.

THE DEMOISELLE CRANE

ANTHROPOIDES VIRGO

PLATE X, Xa.

GRUS BALARICA sive VIPIO, Pliny, H. U. lib. X. cap. 49.

LA DEMOISELLE DE NUMIDIE, Mém. Acad. Roy. d. Sci. Paris 1666—99, III. pt. 2. p. 323 (1733) — Buff. Hist. Nat. Ois. VII. p. 313, tab. 15 (1780) — Daubent. Pl. Enl. VIII. pl. 241 (1783).

THE NUMIDIAN CRANE, Albin, Nat. Hist. B. III. p. 78 pl. 83 (1740) — Shaw & Nodder, Nat. Misc. XXIV. pl. 1041 (1813).

THE DEMOISELLE OF NUMIDIA, Edw. Nat. Hist. B. III. p. 134, pl. 134 (1750).

LA GRUE DE NUMIDIE, Briss. Orn. V. p. 388 (1760).

ARDEA VIRGO, Linn. Syst. Nat. I. p. 234 (1766) — Gmel. Syst. Nat. I. p. 619 (1788) — Vieill. Gal. Ois. Suppl. pl. 18 (1825).

DEMOISELLE HERON, Lath. Gen. Syn. III. pt. 1 p, 35 (1785).

GRUS VIRGO, Pall. Zoogr. Rosso-Asiat. II. p. 108 (1811) — Wagl. Syst. Av. *Grus*, sp. 2 (1827) — Naum. Vog. Deutschl. IX. p. 386, pl. 232 (1838) — Temm. Man. d'Orn. IV. p. 367 (1840) — Werner, Atlas, *Grall.* pl. 25 (1840) — Keys. & Blas. Wirb. Eur. p. LXIX (1840) — Nordm. & Demidoff's Voy. Russ Mérid III. p. 267 (1840) — Mühle, Orn. Griechenl. p. 93 (1844) — Schleg. Rev. Crit. p. CI (1844) — Brehm, Vogelf. p. 291 (1855) — id. J. f. O. 1857 p. 86 — Sundev. Sv. Fogl. pl. 77 fig. 4 (1859) — Linderm. Vog. Griechenl. p. 131 (1860); Blasius, Ibis, 1862 p. 71 — Radde, Reis. Sibir. Vög. p. 320 (1863) — Schleg. Mus. P.-B. *Ralli* p. 6 (1865) — Drake, Ibis, 1867 p. 429 — Swinh. Ibis, 1867 p. 413 — Borggr. Vogelf. Norddeutschl. p. 108 (1869) — Saund. Ibis, 1869. p. 174 — Cullen, Field, XXXIV. p. 216 (1869) — Elwes & Buckl. Ibis, 1870 p. 333 — Swinh. P. Z. S. 1871 p. 403 — Gray, B. West Scotl. p. 271 (1871) — Finsch & Hartl. Vög. Ostafr. p. 673 1872) — Harting, Handb. Br. B. p. 146 (1872) — Shelley, B. Egypt, p. 264 (1872) — Severtz Turkest. Jevotn. p. 68 (1873) — Heugl. Orn. N. O. Afr. II. pt. 1. p. 1254 (1873) — Irby, B. Gibr. p. 181 (1875) — Dresser, Ibis, 1876 p. 324 — Blanf. East. Persia, II. p. 286 (1876); Finsch, Ibis, 1877, p. 52 — id. Verh. Zool.-bot. Ver. Wien, XXIX. p. 248 (1879) — Dresser, B. Eur. VII. p. 353 pl. 506 (1879) — Scully, Ibis, 1881, p. 588 — Tegetm. & Blyth, Monogr. Cranes, p. 26 (1881) — Seebohm, Ibis, 1882, p. 226 et 1883, p. 31 — Severtz. t. c. p. 80 — B. O. U. List Brit. B. p. 152 (1883) — Saund. ed Yarrell's Brit. B. III. p. 192 (1883) — Seebohm, Hist. Brit. B. II. p. 575 pl. 36 (1884) — Radde, Orn. Cauc. p. 393 (1884) — Ibis, 1888, p. 243 — Reid, Ibis, 1885 p. 252 — Pleske, Mém. Acad Imp. Sci. St. Pétersb. (7), XXXVI., p. 49 (1889) — Lilford, Ibis, 1889 p. 337 — Dresser, Ibis, 1891, p. 369 — Gâtke, Vogelw. Helgol. p. 466 (1891) — Seebohm, Ibis, 1892 p. 21.

ANTHROPOIDES VIRGO, Vieill. Nouv. Dict. d'Hist. Nat. II. p. 163 (1816) — Less. Tr. d'Orn. p. 587 (1831) — Gould, B. Eur. IV. pl. 272 (1837) — Jerd. Madr. Journ. XI. p. 194 (1840) — Hodgs. Icon. ined. in Brit. Mus., *Grallæ* pl. 58 (n°. 588) — id. in Gray's Zool. Misc. p. 86 (1844) — Gray, List *Grallæ* Brit. Mus. p. 75 (1844) — id. Cat. Mamm. etc. Nepal. pres. Hodgs. p. 133 (1846) — Blyth, Cat. B. Mus. As. Soc. p. 274 (1849) — Heugl. Syst. Ueb. p. 37 (1856) — Bp. Consp. p. II. 101 (1857) — Salvin, Ibis, 1859, p. 355 — Tristr. Ibis, 1860, p. 76 — Irby, Ibis, 1861, p. 243 — Hartm. J. f. O. 1863, p. 462 — Wright, Ibis, 1864, p. 142 — Jerd. B. Ind. III p. 666 (1864) — Antinori, Cat. Ucc. d'Afr. p. 100 (1864) — Willemoes-Suhm, Zool. Gart. 1865, p. 152 — Degl. & Gerbe, Orn. Eur. II. p. 279 (1867) — Loche, Explor. Scient. Algerie, II. 120 (1867) — Beavan, Ibis, 1868, p. 391 — Dybowsky & Parvex, J. f. O. 1868, p. 337 — Doderl. Avif. Sicil. p. 208 (1869) — Fritsch, Vög. Eur. p. 309 tab. 44, fig. 1. (1870) — Salvad. Faun. Ital. Ucc. pp. 238, 320 (1871) — Saund. Ibis, 1871 p. 389 — Gray, Handl. B. III. p. 25, n°. 10092 (1871) — Hume, Str. Feath. I, p. 235 (1873) — Adam, t, c. p. 295 — Tacz. J. f. O. 1873 p. 100 — Ball, Str. Feath. II. p. 420 (1874) — Butler, Str. Feath. IV. p. 15 (1876) — Fairbank, t. c. p. 263 — Tacz. Bull. Soc. Zool. Fr. 1 p. 246 (1876) — Garrod, P. Z. S. 1876 p. 277 — Butler, Str. Feath. V. p. 232 (1877) — Prjevalsky in Rowl. Orn. Misc. III. p. 48 (1877) — Davidson & Wenden, Str. Feath. VII. p. 88 (1878) — Hume, Str. Feath. VIII. p. 112 (1879) — Scully, t. c. pp. 352, 366 — Butl. Cat. B. Sind, etc. p. 60 (1879) id. Cat. B. S. Bomb. Pres. p. 75 (1880) — Hume & Marsh. Game-B. Ind. III. p. 31 pl. IV. (1880) — Schmidt, P. Z. S. 1880, p. 315 — Reid, Str. Feath. X. p. 68 (1881) — Biddulph, Ibis, 1881, p. 95 — Gigl. t. c. p. 184 — Davidson, Str. Feath. X. p. 320 — Forbes, P. Z. S. 1882, p. 353 — Murray Vertebr. Zool. Sind, p. 237 (1884) — Bogd. Consp. Av. Imp. Ross. p. 109 (1884) — Salvad. Ucc. Ital. p. 240 (1887) — Taylor, Str. Feath. X. p. 531 (1887) — Giglioli, Avif. Ital. 1st Resoc. I p. 557 (1889), II. p. 644 (1890) — Brusina, Motr. (Orn. Croat.) p. 58 (1890) — Frivaldsky, Aves Hung. p. 127 (1891) — Sharpe, Cat. B. Brit. Mus. XXIII. p. 269 (1894).

SCOPS VIRGO, Gray, List Gen. B. 1841 p. 86 — id. Gen. B. III. p. 553 (1845) — Reichenb. Handb. Fulic. tab. CXXIX. fig. 1237 (1852).

PHILORCHEMON VIRGO, Gloger, Handb. Naturg. p. 438 (1842).

GRUS ORNATA, Brehm, Vogelf. p. 291 (1855).
GRUS (ANTHROPOIDES) VIRGO, David & Oust. Ois. Chine, p. 436 (1877).

Vernacular names. The Demoiselle Crane (English); de Jufferkraan (Dutch); la Demoiselle de Numidie (French); der Jungfernkranich (German); Karchira-Togorü (= the screaming Crane of the Burjates on the Upper Irkut); Anehazuzu (Japanese); Raho-Karkarra (of the Arabs); Karronch (in India), Karkarra (in India, by the Shikarees); Damigella (Maltese). Wrongly called Coollen by some Indian writers, as this name applies to *Grus cinerea.*

Adult. General colour bluish pearly grey. Bastard wing, primaries, primary coverts and quills blackish washed with grey. Secondaries partly slate colour, blackish towards the ends, the innermost enormously elongated, grey with dark tips, falcated and pendant. Tail dark grey. Crown of head grey like the rest of the body. Remainder of the head including the nape and about 1½ inches down the neck and the whole of the throat and foreneck slaty black. The feathers of the latter part are elongated and pendant. A white streak of feathers extends to above the ear coverts, and developes into a tuft of white, elongated, silky plumes of about 3 inches in length. Bill greyish olive colour with reddish tip. Iris generally crimson, but varying very much in colour. Legs greyish horn-colour. Total length about 33 inches but varying very much in different individuals, independently of sex, the males, however, being usually the larger birds. Measurement of a bird in the Leiden Museum are wing 19′, tail 6½′, tarsus 7′, middle toe & claw 3′, culmen 2½′.

Immature. Similar to the adult, but general colour more dusky. Head light grey. Eartufts indicated by tufts of straight grey feathers pointing backwards and resembling in general aspect a small wing. Neck darkish, also inner secondaries, the feathers of both these parts not being very visibly lengthened. (Description of a specimen in the Leiden Museum).

Chick. I have not succeeded in meeting with a newly hatched chick, but have found one in the Leiden Museum on which the feathers were beginning to appear. Head covered with yellowish white down, the rest of the body with brownish grey down. The grey ear tufts of the immature dress are beginning to show, also some feathers on the sides of the body. (This specimen is figured on plate X*a*).

Egg. Figured of the natural size plate XVIII nº. 1 from a specimen in the Leiden Museum.

Hab. South-eastern Europe and throughout Central Asia to Mongolia, wintering in North and North-eastern Africa and North-western India.

The Demoiselle Crane, as it is usually called, was known to the ancients[1]). Aristotle gave it the name of 'Actor' or 'Comedian', Pliny called it the 'Parasite' and the 'Dancer'. Pliny undoubtedly intended to refer to this species when he said "the preople of the Balearic Islands call the Lesser Crane 'vipio'," because there is no other Crane smaller than the Common Crane that can have visited these islands. In the same way his 'Balearic Crane', the tuft of which he compares to that of the Black Woodpecker, *(Picus martius)* should probably be referred to the Demoiselle, and not to *Balearica pavonina*, there being some slight resemblance between the tuft on the head of the Woodpecker and the eartufts of this Crane, but none at all between the former and the large crest of the Crowned Crane.

One of the first accounts of this species in modern days was published in 1733 in the "Mémoires de l'Academie Royale des Sciences" of Paris[2]), where the bird is figured, and even an anatomical description of it is given. In 1676 M. N. Robert published in Paris, in his book of prints, a copper plate on which a number of these Cranes were figured in their various dancing attitudes taken from living birds kept in the Ménagerie du Roi at Versailles. Buffon tells us that it had been communicated to him by order of "Monsieur le Maréchal, duc de Mouchy, Gouverneur de Versailles et de "la Ménagerie du Roi," that the said birds in the King's Ménagerie had bred, and that one of the young born there had lived at Versailles for twenty-four years before it died. Buffon also says that the birds at Versailles had been brought there from Numidie, and were six in number. He adds that very little is known about them in their native haunts.

The Demoiselle Crane has always been famous for its graceful form and its wonderful dances and attitudes, and was supposed to imitate man in its actions. Albin in his 'Natural History' describes it as the 'Numidian Crane', and gives a figure of a bird that he had seen alive at Sir Henry Maynard's. As his book was published in 1740 this must have been anterior to that date.

The summer or breeding range of the Demoiselle Crane is very extensive. So far as we know it is the only Crane that breeds in three continents — Africa, Europe, and Asia. But over this enormous range the bird is only locally distributed as a summer resident. Loche found it breeding in the sandy plains of the south of Algeria in the years

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1) In the Journal of Helenic studies pl. 82, 1887 is a reproduction of an Attic alabastrum painted by Pasiades about 480 years B. C. on which a Demoiselle Crane is represented between two Bacchantes, the white ear tufts and dark pendant breastfeathers being curiously enough painted yellow.

2) Tome III 1666—99. pt. 2 p. 323 pl. 321 (1733).

THE DEMOISELLE CRANE, CHICK.

1840—42. Irby states that it used to breed in former days in the marismas of the Guadalquivir, and adds that specimens are often obtained at Seville in March, April and the beginning of May, and again in August, so that he supposes that they must nest a little more to the north. In spite of all his exertions Mr. Howard Saunders did not succeed in finding its nesting places in Southern Spain. Going more to the east we find this Crane breeding in the Dobrudscha, where the lagoons offer it ample and suitable accommodation. It also breeds more to the north all round the Black Sea in the steppes of Southern Russia, according to Seebohm up to the 50th degree of latitude, and in the northern steppes of the Caucasus. Dr. Radde tells us he found it sparsely in the Caucasus near the Goktschai Lake, but numerous in the Mughan steppe and every-where in general where the country was flat and partook of the steppe character, even in places with scarcely any vegetation. It was especially abundant in the hot plains, but became rarer at an altitude of 2000 feet. In Turkestan, according to Severtzow, it is found all over the country going as far up as 10,000 feet and thus extending throughout his four vertical districts, which include the salt-plains, the cultivated country, the grassy steppes, the larch-woods, apple and ash groves of the Karatau, and the lower Thian Shan Mountains, together with the fir and birch and the juniper districts. In the Pamir, Severtzow did not find this Crane. Bogdanow met with it abundantly in summer in the Thian Shan Mountains, also in Kuldscha and Dsungaria. Finsch found it breeding on the plateaux of the Tarbagatai Mountains, on lake Ala-kul and on the Ob. Bogdanow, Dybowski, Radde and David record its breeding in the Altai, along the Irtysch, the Irkut and the eastern tributaries of the Jenissei, round Kossogul Lake, in Transbaikalia, around the Tarei-Nor, on the high table lands of Mongolia and as far south as the deserts of Alashan, also in Dauria, and in the open valleys of the wooded eastern slopes of the Apple Mountains near the Sea of Ochotsk.

The result of all these observations is that if we draw a line across Asia from Alexandrowski, near the mouth of the Amur, to Jekaterinoslaw on the Dnieper in Southern Russia, bending southwards along the western coasts of the Black Sea to the Dobrudscha, we pass through the stronghold of the breeding-range of this species, while its nesting in Southern Spain and in Algeria must be regarded as more or less exceptional.

The Demoiselle Crane is one of the few species of the family on the habits of which we find tolerably numerous observations on record. Although it lives, like most of its congeners, in the vicinity of streams and lakes, it does not require a real swamp or even wet ground on which to make its nest. What it wants is an open steppe, which may be unproductive in the extreme, as observed by Radde in the Caucasus, whilst high table-lands and stretches of flat open country in valleys and along slopes of mountainous districts answer its purpose equally well. The nest is usually placed in an isolated part of the steppe on sand, and is formed of a few dry grasses, or of small pebbles in a small depression of the soil. About the construction of this pebble-nest Dr. Dybowski, who found such a one in Darusun, says: — "They build on the rocky banks of the rivers. The nest is formed of small pebbles, which are so "arranged as to join each other perfectly, and to leave no openings between them. It is either quite flat or a "little depressed in the middle, and is sometimes placed on a slight elevation". He adds that all cracks and holes of the ground round it, are also filled up with stones. This last precaution is probably to prevent the young birds when just hatched and still feeble, from falling into the holes and getting injured. What the meaning of this curious pebble-nest is, it is not easy to say, perhaps in those parts of the country there is no other material available, and the ground being very uneven and rocky the birds have found out that small smooth pebbles make a suitable couch for the eggs. It is also possible that they have discovered that pebbles once heated, keep warm for a long time, or that the eggs are less visible on such a stony spotted surface. I remember to have seen in France some years ago a nest of a pair of these birds, which had the free run of some fifteen acres of dry park-land. In this case the nest also contained pebbles, but the whole surface of it was not covered with them. They formed rather an addition to, than the real material of the nest; perhaps, however, this may have been attributable to the want of other material close at hand. The eggs are laid from the end of April to the middle of July according to circumstances. Seebohm, who found a nest on the Lower Danube, tells us that the two eggs are placed side by side in the nest, with the small ends pointing in the same direction; that both birds assist in the incubation and that when one is sitting its partner is generally not far away standing sentinel, and ready to give the alarm in case of danger. The parents have a habit when disturbed of walking away from the nest for some distance, and then take wing, soon returning when the intrusion is over.

The little chicks, which follow the parents soon after they are hatched, are guarded by the old birds, which at other times are very timid, against birds of prey and even dogs, with great courage The young, which grow very quickly, feed on insects and vegetable matter, and stay with the parents till the following spring. Very interesting accounts of the habits of this bird from its arrival on its breeding grounds until the eggs are laid, are given by Nordmann and Demidoff as to birds observed in Southern Russia, and by Radde as to birds on the Tarei-Nor. In the south of Russia, Nordmann saw these Cranes arrive from the south in the first half of March in flocks numbering sometimes as many as from two to three hundred birds. They flew very high generally in the form of a wedge and during their flight the individual birds often changed their place in the flock and were very noisy. After their arrival the flocks keep together for

some time and even after they have paired and each pair has been about its business separately during the day, they still assemble together morning and night, to dance and fly about in company. For the place of assembly on the steppes they generally choose the flat banks of a river and there they form a circle or several long rows, and begin their extraordinary dances. After having danced sufficiently they all fly up in the air, and there continue their amusements slowly describing large circles. On fine calm days they are especially active at these games. After a few weeks these assemblies cease, the birds begin to look out for a suitable place for their nests and are only seen in pairs.

Radde observed these same dancing parties on the Tarei-Nor, but the birds only arrived at the end of April beginning to nest about a month later. On the Apple Mountains he found young birds still unable to fly on the 30th July.

The Demoiselle Crane appears to have two winter-quarters, one being Northern Africa and especially the north eastern part of it in the valley of the Nile, and the other the peninsula of India. It is probable that the birds from the Caspian and Black Sea migrate to Africa, whilst the Asiatic birds go to India. The South Russian birds leave their summerhaunts about the middle of September, arriving on the Blue and White Nile in that same month or in October. Here they were observed about that time in countless numbers by Brehm as recorded by Finsch and Hartlaub.

It has been observed that the Cranes moult in these winter-quarters, and that the moult begins as soon as they have arrived. They rest and pass the night on the banks of the river or on the flat sandy islands in the midst of the stream, going in quest of food to the plains and cultivated fields. Their food in summer consists mostly of insects, worms, frogs, etc., although green-meat is not despised: in winter it is chiefly grain and vegetable matter which they gather in the fields.

Von Heuglin found these birds in Berber, the western part of Taka, and over the whole of Sennaar. He did not meet with them south of the twelfth parallel, and doubts wheter either they or *Grus cinerea* ever go more to the south, nor is there reliable evidence to the contrary of this statement. In March they migrate back to the north, although some individuals have been observed as late as May by Hartmann in Northern Sennaar, and he was informed by the natives that some remain there all through the rainy season. Sir William H. Flower, when in Egypt, saw these Cranes in thousands near Aboo Girgeh in Middle Egypt migrating northwards, whilst Capt. Shelley observed a large flock on the 2nd April near Benisouef in the north of Egypt. During their travels northwards they always seem to follow more or less nearly the course of the Nile as they do going southwards in September. Lord Lilford noticed a flock of thirty during some days about the middle of April in Cyprus, where Dr. Guillemard has also recorded their passage in that same month. Graf von der Mühle has recorded their migration over Greece in September, and supposes, because he shot a young bird in the marshes of Negropolis, that they must breed there. This was, however, probably a bird on its travels southwards from the shores of the Black Sea, as the supposition of its nesting in Greece has since been proved not to be true. In the Dobrudscha the birds arrive in the middle of April and about the same time in Southern Russia. In South-western Europe we find accidental occurrences of this species in Dalmatia, in Italy, (in Corsica and Sardinia) in Malta, and in the Balearic Islands. In the south of Spain Irby observed it on migration going south in August and going north again in March, April and the early part of May. Howard Saunders saw it often in the flesh in Seville market, although he did not succeed in shooting one, and remarks that it is by no means rare during the winter. During the winter it has been observed in Marocco, and Canon Tristram saw a small flock on a salt pond in Southern Algeria at this season. In other parts of Europe *Anthropoides virgo* has been obtained occasionally as a straggler, and as many of the specimens imported every year and kept in Zoological Gardens frequently escape, it is by no means certain that all the instances recorded refer to genuine wild birds. Frivaldsky records a specimen obtained in Hungary, Temminck says it has occurred twice in Switzerland, Gâtke records it from Heligoland in 1837, Saunders mentions the capture of a specimen out of a flock of three at Deerness in the Orkneys in 1863, and it has also been *said* to occur in Sweden and in Germany. Canon Tristram informs me that during his voyage in Japan in 1890 he saw unmistakable pictures of this bird in several Japanese temples represented in hawking scenes, and Prof. Ijima informs me that two specimens shot in Japan are in the Museum of Tokio taken in the province of Izu and that it has always been a rare species on migragration in the Japanese Empire.

In Asia the greater number of Demoiselle Cranes migrate to the southern parts of that continent, passing over the Himalayas to India. A few of the more western birds may perhaps journey to Egypt, but this is only a matter of conjecture. As regards their migration in middle Asia, Radde informs us that he observed old and young birds beginning to try the strength of their wings on the 30th July by describing circles in the air. On the 13th August he observed their arrival in numerous conpanies on the Tarei Nor, always keeeping to the wedge-form in their flights. They arrived not only from the north but from every direction, so that it seemed probable that the Tarei-Nor is a point of assembly of the birds of the whole region before the departure to the south; and this agrees with the observations of Père David who says that this bird is extremely rare in the Pekin plains during migration. The birds which nest to the north of it evidently migrate westward to the Tarei-Nor region and assemble there before going south.

On the 15th August Radde found the Cranes in great excitement and subdivided into larger and smaller parties, excursions going on all day. The following day the greater number of them had left; on the 22nd only a few remained and on the 30th not a single bird was left on the Tarei-Nor. Prjevalsky saw large flocks passing over Northern Tibet in autumn without halting. These observations agree on the whole with those of Dr. Dybowski, who also gives the middle of August as the date when the birds begin to migrate: he adds, however, that some remain in Kultuk as late as the end of September. After having left their breeding-quarters the birds pass to the south with India as the object of their travels. On their way south, from Tibet, they have been observed by Prjewalsky on the 16th September, flying over Kan-su in a large flock, whilst captain Beavan mentions having seen them passing in that same direction over Mount Tonglu.

As regards birds from the more western parts of Asia we get information from Scully and from Biddulph, who saw them fly Southward over Gilgit, Biddulph adding that the Pamir birds came down by the Hunza valley.

It is evident from the near conformity of the dates of departure in the north and arrival at the northern limit of their winter-quarters, that the birds hurry on, taking little rest; but once arrived at the Himalayas they appear often to stay there in the valleys and to rest for a few weeks before spreading over India, where they are only seen to appear about the beginning of October, as observed by Butler in Northern Guzerat. In India they are spread over the greater part of the country, becoming rare in the extreme southern parts and being unknown along the eastern coast south of the 24th parallel. This Crane has also never been recorded from Burmah or anywhere east of the Brahmaputra. It is common in Cutch, Kathiawar and Guzerat and along the Tapti valley from Central India to the west coast, also in Mysore and the Nizam territory. Murray mentions its presence in Afghanistan and Beloochistan. In the central parts of the peninsula it is less numerous than in the north-western parts, which must be regarded as its true winter-quarters. Hence it extends south of the Himalayas eastwards into Assam in the Darrang district.

Jerdon found these Cranes much more numerous in their favourite haunts than *Grus cinerea*, being most abundant near large rivers. They arrive in flocks of from 30 to 500 individuals, frequenting the rivers and tanks to rest and drink, and the fields morning and evening to feed, chiefly on grain and other vegetable matter. Jerdon only observed them along the rivers, but Butler often saw the tanks in Guzerat fringed with a blue margin of these birds at least sixty yards wide and extending over several acres of ground, and Reid made similar observations as to their abundance, in the shallow jheels or tanks of Lucknow. Mr. G. Vidal noticed that the first weeks after their arrival the birds spend nearly all their time on the wing, seldom, except at night, alighting on the fields. They descend usually to the river-banks to drink both morning and evening. At this time of the year it is almost impossible to approach them, When the crops have been reaped they grow less wild, and may be found feeding in the stubbles in the early morning from sunrise till 8 a. m. when they again take wing mostly soaring about in large circles at a great height till the evening.

Their favourite food in the vicinity of Sattara consists of the 'Karda' or Saf-flower Oil-seed (*Cartamus tinctorius*) which is sown in alternate rows with linseed. They roost sometimes on bare open plains in a long single line, with sentinels posted on all sides, and sometimes on the banks of large tanks, congregating in vast flocks by night and separating into smaller parties of from twenty to a hundred birds as they go afield at early dawn.

Mr. Vidal adds that no sort of sanctity attaches to this bird or the Common Crane in Northern India, but on this subject Mr. Theobald writes from Collegal in the south that "the Brahmins there and in Mysore, consider them sacred "and with their usual hazy conceptions of geography say, that they come from a high mountain near Kashi (Benares) "called in Sanskrit Himovuth Parvuthum or Snowy Mountain. Some rayahs leave small patches of paddy uncut for these "birds to feed on. A naturalist runs some risk in shooting one of these birds near a Brahmin village here. In the north "of India I hear it is the Sarus Crane which is considered a sacred bird but not this one. The Brahmins about here "confound, I suppose, the one with the other".

During its stay in India the Demoiselle Crane is occasionally flown at with a falcon. It is said, according to Jerdon, to make a fine flight, sometimes going two or three miles. It never uses its beak in self-defence, but is very apt to injure the falcon with its sharp inner claw. A well-trained falcon therefore always strikes this Crane on the back and never on the head. The mate of the stricken bird often turns and comes to the rescue of its companion.

Like other Cranes this species is greatly attached to its mate, and Hodgson mentions another example of this virtue. He says "once having fired at a flock high over head on the plain near the Bhurtenan Railway-station, one bird "dropped suddenly. After the flock had gone on two or three hundred yards, a second one dashed down along with it "and seemed, as we ran up, to be endeavouring to rouse its lifeless mate. Despite the usual shyness of these birds, "this faithful comrade did not take wing till we were within twenty yards, and even then, though the rest of the flock "were out of sight, hung high in the air circling and calling above us for a long time".

These Cranes desert their winter quarters in the first half of the month of March, but some years they seem to leave earlier as Prjevalsky once saw a flock arrive on the Koko-Nor as early as the 28th February. Butler saw their departure on the 14th from Deesa in Guzerat, Davidson observed them flying northeastwards in large flocks over the

Satpura Mountains in West Central India. Hodgson saw them arrive in Nepal early in May and at the end of April, and noticed that the birds took a rest in the valley of about a week before continuing their journey northward, as they also did in autumn before entering India. Scully observed them pass over Gilgit on the 21st March, Dr. Blanford saw them migrating over Eastern Persia, Pleske mentions their passage on the Iskander-Kul in Turkestan, Swinhoe records their being abundant on passage in spring as well as in autumn at Seuen-hwa-foo in China.

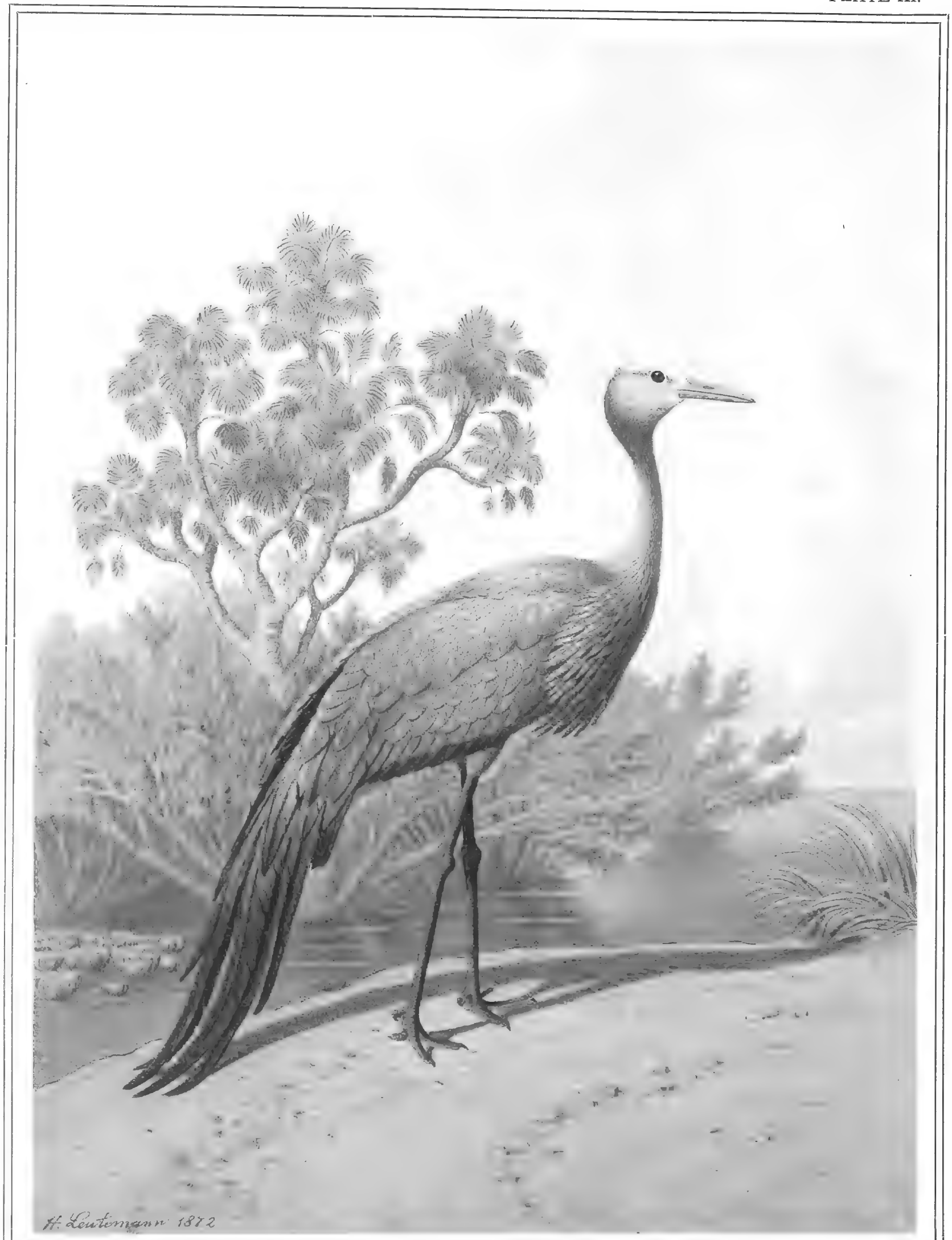
Except that some flocks, as already stated, halt in Nepal not much time appears to the spent by this Crane in its migrations, as Prjevalsky saw them arrive in Mongolia ot the end of March, Radde found them on the 24th April again on the Tarei-Nor and Dybowski saw them arrive in the Irkut valley in the first half of May.

The Demoiselle Crane generally lives well in confinement and instances of its having attained an age of 13 and even 24 years, are on record. It is often imported alive into Western Europe, principally from the breeding grounds in Southern Russia, and I am told these birds have generally been reared by hand by the natives there, who have taken them captive when still unable to fly. As mentioned above, probably the first birds that reached Europe alive were those at the Versailles Menagerie in 1676, which came from what was formerly called Numidia in North Africa. The Zoological Garden of Amsterdam received their first specimens in 1855 and the Zoological Society af London in 1863. Now they are to be seen in almost every Zoological Garden all over the continent and in private collections also. These graceful Cranes have often bred in captivity as well in their native country, where they are often kept as pets, as in Zoological Gardens and private collections. The first birds which came to Versailles bred there, and a bird that was successfully reared lived there for twenty-four years. The late M. Cornély at Tours in France often succeeded in rearing young Demoiselle Cranes and two years ago a bird was born in the Zoological Garden of Cologne, which arrived at the adult stage with very little trouble, thanks to the continual care of the parent birds.

Conformably with its habits in a free state this bird thrives best on a dry sandy soil, and a handful of grain and a little raw meat added to the insects and worms which it finds for itself in the enclosure, suffices to keep it in good health. It is a most ornamental, graceful, and harmless bird, which ought to be kept in parks much more often than is done, probably from its being not sufficiently known.

The trachea of this species enters into a depression of the keel of the sternum bending afterwards round the mons interclavicularis before entering into the lungs. The specimen figured is from a bird which lived in captivity in my own Menagerie.

Trachea of Anthropoides virgo.



THE STANLEY CRANE.

II.

THE STANLEY CRANE

ANTHROPOIDES PARADISEA

PLATES XI, XIa.

ARDEA PARADISEA, Licht. Cat. Rer. Rariss. Hamb. p. 28 (1793) — id. Verz. Doubl. p. 78 (1823).
TETRAPTERYX CAPENSIS, Thunb. K. Vetensk. Akad. Forh. 1818, p. 242, t. 8.
ANTHROPOIDES STANLEYANUS, Vigors, Zool. Journ. II. p. 234, pl. 8 (1826) — Layard, B. S. Afr. p. 303 (1867) — Chapm. Trav. S. Afr. II. app. p. 417 (1868) — Ayres, Ibis, 1869 p. 300 — Layard, t. c. p. 376 — Ayres, Ibis, 1871, p. 269 — Barratt, Ibis, 1876, p. 209.
GRUS STANLEYANA, Wagl. Syst. Av. *Grus*, sp. 3 (1827).
GRUS PARADISEA, Wagl. t. c. sp. 8 — Grill, Zool. Anteckn. p. 54 (1859) — Schleg. Mus. P.-B., *Ralli*, p. 6 (1865) — Finsch & Hartl. Vog. Ost-Afr. p. 671 (1870) — Tegetm. & Blyth, Monogr. Cranes, p. 23 (1881) — Shelley, Ibis, 1882, p. 363 — Butler, Feilden & Reid, Zool. 1882, p. 342.
GRUS CAPENSIS, Less. Tr. d'Orn. p. 587 (1831).
ANTHROPOIDES PARADISEA, Less. op. cit. p. 587 — Martin, P. Z. S. 1836, p. 30 — Gray, List. *Grallæ* Brit. Mus. p. 75 (1844) — id. Handl. B. III. p. 25, no. 10093 (1871) — Sharpe & Layard, B. S. Africa, p. 628 (1884).
SCOPS PARADISEA, G. R. Gray, Gen. B. III. p. 553 (1845) — J. E. Gray, Knows. Men. pl. XIV (1846).
TETRAPTERYX PARADISEA, Bp. consp. II. p. 101 (1854) — Gurney in Andersson's B. Dam. Land, p. 278 (1872) — Buckley, Ibis, 1874, p. 389 — Holub & Pelz. Beitr. Orn. S.-Afr. p. 248 (1882) — Forbes, P. Z. S. 1882, p. 353 — Sharpe, Cat. B. Brit. Mus. XXIII. p. 268 (1894).
GERANUS PARADISEA, Bp. Compt. Rend. XXXVIII. p. 661, note (1854).
GRUS CAFFRA, Fritsch, Drei Jahre in Sudafr. p. 108 (1868).

Vernacular names. The Stanley Crane (English); de Paradijskraan (Dutch); la Grue de Paradis (French); der Paradies Kranich (German); Great Locust bird (Cape); Groote Sprinkhaanvogel (Boers, Transvaal).

Adult. General colour above and below bluish pearl-grey, the feathers of the upper surface with more or less visible pale ashy margins. Primaries black, secondaries dark grey, the innermost ones grey, like the back, with black tips, enormously lengthened, falcated, pointed, and nearly touching the ground. Lores and crown white. Feathers of cheeks, ear-region and nape dark ashy-grey, lengthened, disintegrated and loose, so as to form a ball. Feathers of fore neck elongated and pointed. Bill flesh colour. Iris blackish-brown. Legs greyish horn-colour. (From a living bird at Lilford Hall). Total length about 40 inches; males generally larger than the females. Wing 23′, tail 8½′, tarsus 12′, culmen 4′, middle toe & claw 3½′ (Specimen in the Leiden Museum).

Immature. Similar to the adult, but general colour lighter. Head feathers whitish grey, and not so much lengthened nor so loose. Inner secondaries very little lengthened and not black at the tips but only a little darker. Feathers of the fore neck not lengthened nor pendent. (Figured on plate XIa from a skin in the Leiden Museum).

Chick. Down pearly grey, darkest at the base of the neck on the back and over the wings. A light line over each shoulder. Down of the head *yellow*. On the whole closely resembling the chick in down of *A. virgo*. (From a chick of about 2 or 3 weeks old in the Paris Museum).

Egg. Figured of the natural size plate XVIII n°. 2 from a specimen laid in the Zoological Garden of Cologne.

Hab. South Africa, east to Mashona-land, west to Great Namaqualand and Damaraland.

This noble Crane has a comparatively short history, and probably the first more or less accurate description of it is to be found in Lichtenstein's "Catalogus Rerum Naturalium Rarissimarum" issued at Hamburg in 1793.

The breeding range of this Crane extends over the southern part of South Africa, the Zambezi, or better the 17th parallel, forming about the most northern limit of its distribution. In the northern parts of the country named, the birds become rare. Over the greater part of it, however, they are scattered in pairs in suitable localities, that is where there is open flat country. Layard found it all the year round near Nellspoort and on the Knysna, Arnot and Fritsch met with it breeding near Colesberg and Butler, Feilden and Reid found it common about New Castle in Natal. On the west coast it was found by Andersson in the breeding season in Damara-land and Great Namaqua-land, and Buckley met with it generally distributed in pairs over the Transvaal. Barratt obtained eggs from Potchefstroom. Besides this, it is commonly found as a breeding bird, as we are informed by Holub and Pelzeln, in the Orange Free State, in West Griqualand, the southern Bechuana country, and the more open parts of the bushveldt of the Kalahari Desert.

We have very little information about the breeding of this species and the reason of it is apparently that not much can be told about it. Like its near ally the Demoiselle Crane it is more partial to open dry plains for the construction of its nest than to damp swampy districts. Butler and Reid, when searching for nests of this bird in the vleys about New Castle, Natal, were informed by a Boer that the birds only scratch a little hole in the open veld to deposit their eggs in the same way as the bustards do, and that they never construct their nests in the vleys like the other Cranes. Mr. Ayres also informs us that they breed in dry places, and this agrees with Layard's observations in the Karroo country. Sometimes, however, the high grass in the neighbourhood of pools is chosen, as Holub and Pelzeln inform us. I find no evidence about the duration of incubation, nor about the habits of the birds when the chicks have been hatched, but in this they will probably resemble the Demoiselle Crane.

The Stanley Crane is only partially a migratory bird. In some parts of the country it is found all the year round, as for instance at Nellspoort and on the Knysna and in the Karroo country, but in other places such as Damara-land and great Namaqua-land, it only comes to breed in the wet season, leaving, when the dry weather begins, to congregate in some chosen place, where it often forms large flocks. Mr. Ayres informs us that the Mooi River, about ten miles above its junction with the Vaal River and the banks of the Vaal itself, about twenty miles below Bloemhof are favourite places of assembly for the bird during migration in winter. He saw them here amusing themselves by dancing and by soaring at an immense height in the air. Barratt observed as many as fifty birds in one of these hibernating flocks. These assemblies generally sleep standing in the water in company with Crowned Cranes, Flamingoes and Storks, and Holub observed that they always try to reach the middle of the pool for the sake of safety, and that if the troop is numerous (as many as 300 birds being sometimes assembled in a large pool) the voices of the birds are heard all through the night and that the sounds come from different parts of the flock, which fact he explains by the supposition that the vigil is kept alternately in every part of the flock and that the birds, whose turn it is to watch, call, and so reassure their companions that the watch is being properly kept. One night the experiment was made to approach a sleeping flock of these Cranes in a pool, but, although all possible pains were taken to come near to them unnoticed under cover of the reeds, the disturbance was signalled when the invaders were some fifty paces distant and soon all the birds flew away. During the day these flocks often mix with the herds of Springbok Antelopes, and all feed together in perfect harmony. The Cranes often warn the Antelopes of coming dangers, being very watchful and flying off as soon as they see anything unusual, when the Antelopes follow their example and run away also. The Cranes do not fly high on these occasions, seldom mounting into the air above a few yards. When migrating they often fly at a great height.

These Cranes are stated to feed a great deal on locusts and in the years that locusts are abundant they become very useful. In the Cape colony, in West-Griqualand and the Bechuana Countries their services in the extermination of locusts are acknowledged and the birds are preserved accordingly as much as possible. In Zulu-land and Matabele-land this is unfortunately not the case and the birds are often killed there by the natives, the long inner secondaries being valued as head-ornaments.

Besides locusts these Cranes feed on all kinds of insects, worms, reptiles, fishes and small mammals, also on different bulbs and other vegetable matter, animal food, however, forming the greater part of their diet.

The voice of this Crane is guttural and although much louder than that of *Anthropoides virgo* has in some of its notes much resemblance to it.

The Zoological Garden of Amsterdam received the first specimen of the Stanley Crane in 1851 and the Zoological Society of London in 1861. At an earlier date, however, birds of this species were kept in Lord Derby's Menagerie at Knowsley, where in 1844 the female of a pair laid as many as seven eggs. These eggs not being laid in a nest but scattered all over the place, were placed in an incubator, but only one chick was hatched, which died after a few days. The following year five eggs were laid and placed under a hen. Two young birds were hatched, one was attacked with cramp after 10 days and died soon afterwards, whilst the other lived for about three weeks when it also died. The young birds ran about from the beginning, feeding themselves from the ground or from the hand.

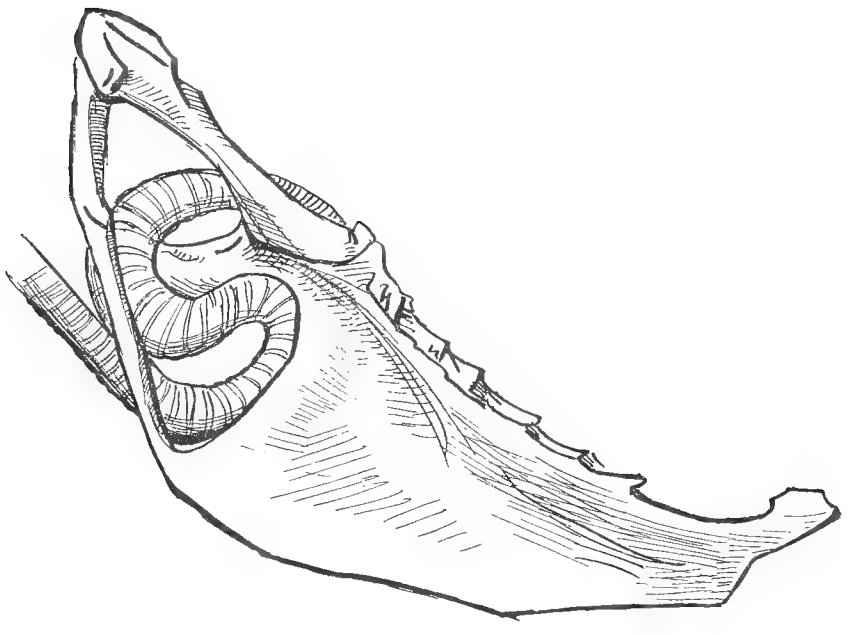
THE STANLEY CRANE, IMMATURE.

This Crane is usually to be seen in the Zoological Gardens of the continent but it is generally not so long lived as most other Cranes. This is perhaps to be attributed to its not getting enough animal food, on which it lives principally in a free state. It would be difficult to supply it with locusts, but perhaps raw meat, chopped fine, would do as well and would from a most useful and welcome addition to the usual grain on which it has to feed in captivity.

This bird is often kept tame in its native country and even when allowed full liberty generally remains near the place where it has been reared, being very gentle in its disposition.

Stanley Cranes are regularly imported by Mr. C. Reiche of Alfeld (Hannover) who informs me that the birds brought to Europe are generally captured in the moulting season. The birds shed all their flight feathers at once and are thus unable to fly, so that they are easily surrounded and driven into an enclosure.

The trachea of this species is a copy on a larger scale of that of *Anthr. virgo*. The specimen figured is from a bird that lived in the Zoological Garden of Amsterdam.



Trachea of Anthropoides paradisea.

THE WATTLED CRANE.

12.

THE WATTLED CRANE

ANTHROPOIDES CARUNCULATA

PLATE XII.

THE WATTLED HERON, Lath. Gen. Syn. III. pt. 1. p. 82, pl. LXXVII (1785).

ARDEA CARUNCULATA, Gm. Syst. Nat. I. p. 643 (1788) — Vieill. Gal. Ois. II. suppl. pl. 20 (1834).

GRUS CARUNCULATA, Vieill. Nouv. Dict. d'Hist. Nat. XIII, p. 559 (1817) — id. Enc. Méth. p. 1140, pl. 53, fig. 3 (1823) — Wagl. Syst. Av. *Grus*, sp. 4 (1827) — Less. Tr. d'Orn. p. 586 (1831) — Guérin, Iconogr. Règne An. pl. 51, fig. 3 — Gray, List. *Grallæ*, Brit. Mus. p. 74 (1844) — id. & Mitch. Gen. B. III. p. 552, pl. 149 (1845) — Rüpp. Syst. Uebers. p. 120 (1845) — Heugl. Syst. Uebers. p. 57 (1856) — Gurney, Ibis, 1864, p. 355 — Layard, B. S. Africa, p. 302 (1867) — Gurney, Ibis, 1868, p. 467 — Gray, Handl. B. III. p. 24, no. 10087 (1871) — Finsch & Hartl. Vög. O.-Afr. p. 670 (1870) — Heugl. Orn. N. O.-Afr. II. pt. 1. p. 1253 (1873) — Mont. Angola, II. p. 203 (1875) — Forbes, P. Z. S. 1877, p. 307 — Holub & Pelz. Beitr. Orn. S.-Afr. p. 247 (1882) — Shelley, Ibis, 1882, p. 363 — Forbes, P. Z. S. 1882, p. 352 — Hartert, Cat. Vögel. Senck. Mus. p. 209 (1891) — Reichenow, Vög. D. O. Afr. p. 46 (1894).

ARDEA PALEARIS, Först. Descr. Anim. p. 47 (1844).

BUGERANUS CARUNCULATUS, Gloger, Handb. Naturg. p. 440 (1842) — Gurney in Andersson's B. Damaral. p. 278 (1872) — Sharpe, Cat. B. Brit. Mus. XXIII, p. 267.

LAOMEDONTIA CARUNCULATA, Reichenb. Handb. Spec. Orn. p. XXIII. (1850) — id. Handb. Fulic. taf. CXXVII, fig. 431 (1852) — Bp. Consp. II. p. 100 (1854) — Bocage, Orn. Angola, p. 436 (1881) — Butl. Feilden & Reid, Zool. 1882, p. 342 — Souza, Jorn. Lisb. XI, p. 80 (1886).

WATTLED CRANE, Chapm. S. Afr. II. App. p. 417 (1868).

Vernacular names. The Wattled Crane (English); de Lelkraan (Dutch); la Grue caronculée (French), der Glocken-Kranich (German).

Adult. General colour above ashy grey. Lower back, rump, upper tail-coverts, and tail black. Mantle blackish grey, sometimes more or less washed with brown, which colour, if present, extends over the upper back [1]). Primaries black, greater wing-coverts pearly grey; secondaries greyish black, innermost ones black, grey at the base, enormously lengthened and pendent. Crown of head slaty grey. Whole of neck from the nape to the mantle, sides of face, throat and neck white, the feathers of the chest being elongated, disintegrated and loose. Base of bill naked, covered with a granulated skin, which extends as far as the nostrils, some of the granulations forming fleshy threads. On the lower mandible the granulated red skin extends as far as beneath the middle of the eye, and continues, but without granulations, to the fore part of the feathered lappet which hangs on each side of the throat [2]). Bill brownish horn-colour. Iris orange yellow, legs greyish black. (From a living bird in the Zoological Garden of Amsterdam). There is no difference in the plumage of the sexes of this species and the description of the female in Layard and Sharpe's 'Birds of South Africa' (p. 627) is doubtless to be referred to an immature bird. The only difference is that in the female the fleshy granulations at the base of the bill are rather less developed, and that the bird is a trifle smaller in size. Wing 26′, tail 10′, tarsus 12′, culmen 7 inches. (Bird in the Leiden Museum).

Immature. Unknown.

Chick. Unknown.

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1) I have a suspicion that this colour is due to discoloration of the feathers just before they are shed at the moult, as freshly moulted birds do not show it so far as I have seen.

2) Lord Lilford observed these lappets are subject to extension.

Egg. Figured of the natural size plate XVIII n°. 3 from a specimen in the British Museum collected by Layard.

Hab. South Africa; on the west coast north to Benguella and the Congo, on the east coast north to Shoa.

The first description of this bird was published in 1785 by Latham, who also gave a tolerably good figure of it. He tells us that the original of his plate was kept alive in the Company's Gardens at the Cape of Good Hope, and that it was not considered as a common bird there. In 1834 Vieillot also figured this Crane from a living example kept in the menagerie of the King of France. But the first really good representation of it was that of Gray and Mitchell in their 'Genera of Birds' published in 1845. On the whole this Crane has continued to maintain the reputation, with which it was presented to the European naturalists on its discovery, as being a rare bird and one about which information is very scarce.

The Wattled Crane is sparsely distributed, being generally met with in pairs, and sometimes in the cold season in small flocks, in suitable places in South Africa. On the west coast it has been recorded by Monteiro as far north as the interior of Benguella and this statement is in a way confirmed by the receipt of a pair of living birds from Banana, at the mouth of the Congo, by the Zoological Society of Amsterdam, in 1894. On the eastern side of Africa, Rüppell records its occurence as far north as Shoa and Peters found it in Mozambique, while Böhm met with it in small troops on the Wualaba River in German East Africa. Livingstone also mentions a "blue crane with white neck", which probably refers to this species. Further south the Wattled Crane was found by Philipp on the Vaal River, and by Holub on the Fish River near Cradock. Andersson, as recorded by Gurney, met with it sparingly in Damara-land during the rainy season, also on the rivers Okavango, Tioge and Drongo, and on Lake Ngami.

On the mode of breeding of this Crane our information is again rather incomplete. Layard tells us that "a single "pair take up their haunt and maintain it for years, breeding constantly in the same nest which is repaired as occasion "requires". He continues "I had the pleasure of watching a pair through my binoculars engaged in this proceeding. Both "the birds contributed to the work, stopping now and then to do a little courting, like an ordinary sparrow or canary, "but surely undignified in so grave a bird! It suggested to me the possibility of an Archbishop or a Lord-Chancellor "making love! Still 'something came of it', for my friend Hugo took two glorious eggs out of that selfsame nest, and "presented them to me, and they now form part of the treasures of the South African Museum".

Mr. Philipp found a nest of this species in Natal. It was placed in a very large lagoon near the Vaal River, and was about five feet in diameter and of a conical form. It was composed of rushes pulled up by the roots, and was placed in water about five feet deep; the eggs being raised well out of the water. The eggs, which were two in number, were taken, and were found to be on the point of being hatched. They now form part of the collection of Mr. Philip Crowley of Waddon House, Croydon. As to the habits of the parents and their chicks I have not been able to find any special information.

This Crane is not a migratory bird, and is usually found in the same locality all the year round. In the cold season however, they sometimes gather together in small troops of about thirty individuals, and then visit places in which they are not usually seen in the breeding season. When flying together in flocks they form the letter V like other Cranes. Perhaps these gatherings are principally formed of immature birds which have been driven away by their parents. It is probable also that unusually dry seasons have something to do with it. These Cranes are very partial to water and are much less terrestrial in their habits than the Stanley Crane. They feed on grain and other vegetable, as well as animal food which they procure in the swamps and lakes.

In localities where they are not disturbed they get tolerably tame, but if shot at or pursued they become as wild and watchful as any of the family.

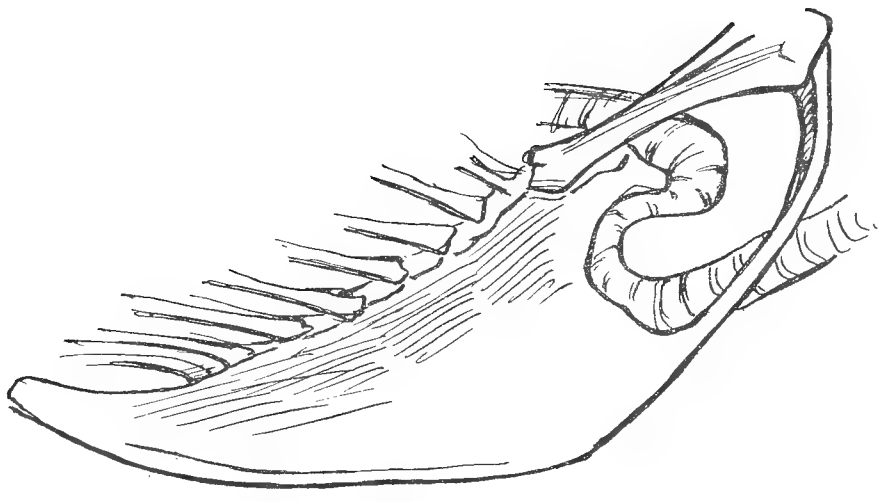
The Zoological Society of London received the first example of this species in 1861, and the Amsterdam Zoological Garden in 1869, but a specimen is stated to have been exhibited in France in the 'Kings Garden' at the beginning of this century.

In recent years this Crane has been occasionally brought over to Europe, but never in any great number, so that it must always be considered as a rarity as well in Zoological Gardens as in private collections.

The Wattled Crane is a very playful bird in captivity and dances and bows down round its keeper in a wonderful way. Monteiro describes a tame specimen kept by a trader at Egito, which used to play for hours with a young donkey. The Crane would run at the donkey and flap its wings in the latter's face till it started after the Crane for a race. When they set off the Crane would keep just a little ahead and only take to flight when hard pressed, on seeing which the donkey would generally give a loud bray of disappointment. At other times the Crane would chase the donkey, and it was very comical to see the perfect understanding that seemed to exist between them, and their evident enjoyment of play and fun.

Mr. C. Reiche of Alfeld is probably the only dealer who occasionally imports specimens of this Crane obtained by his correspondents in the Transvaal.

The trachea of this species is almost an exact larger copy of that of *Anthr. virgo* and *Anthr. paradisea*. The specimen figured is in the Leiden Museum.



Trachea of Anthropoides carunculata.

THE WHITE-NECKED CRANE, ADULTS AND CHICK.

13.

THE WHITE-NECKED CRANE

ANTHROPOIDES LEUCAUCHEN

PLATE XIII.

GRUS ANTIGONE, (nec L.) Pall. Zoogr. Rosso-As. II. p. 102 (1811) — Dybowski & Parvex, J. f. O. 1868, p. 337 — Seebohm, Ibis, 1879, p. 28 — Blakist. & Pryer, B. Japan, p. 122 (1882).

GRUS LEUCAUCHEN, Temm. Pl. Col. V. pl. 449 (1838) — Gray, List. *Grallæ* Brit. Mus. p. 74 (1844) — id. Gen. B. III. p. 552 (1845) — Temm. & Schleg. Faun. Jap. p. 119 (1850) — Radde, Reis. in Sibir., Vög. p. 314. taf. 14, fig. 2, egg. (1863) — Swinh. P. Z. S. 1871, p. 402 — Tacz. J. f. O. 1873, p. 100 et 1874, p. 336 — Elwes, P. Z. S. 1873, p. 649 — Tacz. Bull. Soc. Zool. Fr. I. p. 246 (1876) — David & Oust. Ois. de la Chine, p. 435 (1877) — Prjevalsky in Rowley's Orn. Misc. II. p. 437 (1877) — Tegetm. & Blyth, Monogr. Cranes, p. 35 (1881) — Blakist. Amended List. B. Jap. p. 12 (1884) — Seebohm, Ibis, 1884, p. 177 — Bogdanow, Consp. Av. Imp. Ross. p. 107 (1884) — Tacz. P. Z. S. 1887 p. 611 et 1888, p. 468 — Seebohm, B. Jap. Emp. p. 352 (1890).

SCOPS VIPIO, Gray, Gen. B. III. p. 553 (1845).

GRUS VIPIO, Bp. Consp. II. p. 98 (1854) — Schleg. Mus. P.-B. *Ralli*, p. 3 (1865) — Gray, Handl. B. III. p. 24, no. 10080 (1871) — Styan, Ibis, 1891 pp. 329, 502.

ANTIGONE LEUCAUCHEN, Bp. Compt. Rend. XXXVIII, p. 661 (1854).

GRUS sp. incogn., Blakist. & Pryer, Ibis, 1878, p. 225.

PSEUDOGERANUS LEUCAUCHEN, Sharpe, Bull. B. O. C. I. p. XXXVII (1893) — id. Cat. B. Brit. Mus. XXIII, p. 266 (1894).

Vernacular names. The White-necked Crane (English); de Witnek Kraan (Dutch); la Grue à cou blanc (French); der Weissnackige Kranich (German); Manazura (Japanese).

Adult. General colour above slaty grey. Wing-coverts lighter, the greater coverts being white at the ends. Primaries blackish with white shafts. Secondaries blackish with white bases, the innermost secondaries white, falcated, lengthened and pendent. Tail dark grey. Forehead and region round the eyes devoid of feathers, and covered with a red skin, extending behind the ears, which are covered by a patch of ashy grey feathers. The red skin, especially at the base of the bill, covered with black hairs. Whole hind neck from the back up to the eyes, ending in a point on the forehead, white, as also the sides of the upper neck and the throat. Remainder of neck, lower neck in front, and under surface of the body dark slaty grey. Iris brownish yellow; bill greenish; legs bluish pink. (From a living bird in the Zoological Garden of Amsterdam). Wing about 24′ inches, tail 8′, tarsus 11′, middle toe & claw 4.6′, culmen $6\frac{1}{2}$′ (specimen in the Leiden Museum).

Immature. Upper part of head (which is entirely covered with soft downy feathers), neck behind, and the whole of the upper parts light cinnamon brown, lightest on the neck, darkest on the mantle and wing coverts. On the head and neck the feathers are entirely cinnamon brown with light bases; on the mantle and wing-coverts the brown colour is acquired by the outer halves of the feathers being brown, whilst the inner part, which is concealed, is grey in nearly the same shade as in the adult bird. Throat yellowish white; lower neck in front greyish yellow. Breast and whole of the underparts grey with slight yellow margins to the feathers. The younger the bird, the more this yellow colour predominates, while as the bird gets older and the feathers become more developed the grey gets the upperhand. Tail- and wing-feathers blackish grey. (Bird bred in the Zoological Garden of Amsterdam in 1872, which died aged 85 days. This bird in a rather younger stage is figured with its parents on plate XIII).

Chick. Yellowish white. Upper part of head, wings and back, brown. (From a chick hatched in the Zoological Garden of Amsterdam).

Egg. Figured of the natural size plate XVIII n°. 4 from a specimen laid in the Zoological Garden of Amsterdam.

Hab. Eastern Siberia, North-eastern Mongolia and Mantchuria, wintering in Corea and the Yangtse basin.

The White-necked Crane is, no doubt, the bird described by Pallas in his 'Zoographia Rosso-Asiatica' as *Grus antigone*. It is also this bird which is mentioned in 'The Ibis' for 1879 by Mr. Seebohm as *Grus antigone*, for there is no proof that the true *Grus antigone* has ever occurred either in Siberia or in Japan. Again Tegetmeier in his 'Monograph of the Cranes' has confounded this species with *Grus japonensis*. He quotes a passage of Messrs Blakiston and Pryer about the hawking of the Tancho, the National Crane of Japan. This is the Japanese name for *Grus japonensis*, and not for *A. leucauchen*, which is called '*Manazuru*' by the Japanese, as Prof. Ijima of Tokio informs me.

The breeding-range of the White-necked Crane extends over the eastern half of Southern Siberia, North-eastern Mongolia and Mantchuria. Radde found it as far west as Lake Kossogul and took its eggs near the Uldsa rivulet. He also found it numerous on Lake Tarei, and in the plains north of the Bureja Mountains. Dr. Dybowski found this Crane breeding in tolerable numbers in the Darasun country (51° 20′ N. lat. and 112° E. long.) on the Amoor and the Ussuri, and Prjevalsky obtained young birds near Lake Hanka. There is no evidence that this species has bred in Japan, and Prof. Ijima thinks it very doubtful whether it has ever done so.

The nest of this Crane, according to Dr. Dybowski, is placed in the marshy parts of the steppes. The birds select an islet elevated a few inches above the surrounding swamp and on it form the nest of dry grass. The structure is flat with a small depression in the middle. The birds are said to be very liable to forsake the eggs if repeatedly disturbed. Prjevalsky tells us that during the breeding season the male is very attentive to the female, making strange gambols before her on the ground, and going through all sorts of peculiar evolutions in the air.

Radde found eggs of this Crane on the 28th April on the Uldsa River; Dybowski obtained eggs on the 3rd May near Darasun, but also as late as the end of June, so that it seems probable that, if disturbed the first time, this Crane lays a second clutch of eggs. In the collection of Mr. Philip Crowley are eggs of this species taken by Parvex and Dybowski on Lake Baikal in 1872. These eggs were originally received by Canon Tristram from the Maison Verreaux by which firm several skins of the birds themselves were obtained at the same time from the same collectors.

The first chicks of this Crane were found by Prjevalsky near Lake Hanka, as early as the 19th May, so that the eggs must have been laid about the middle of April. In confinement a pair of these Cranes bred repeatedly in the Zoological Garden of Amsterdam [1]), where the incubation was observed to last 30 days, and the young birds under the tender care of the parents grew with astonishing rapidity.

The White-necked Cranes leave their summer quarters in autumn and migrate to the south to spend the winter in the Yangtse basin, where specimens were obtained by Styan near Shanghai on January 5th 1889, and in Corea. In Corea they are abundant in winter being found everywhere, although less numerous than *G. japonensis*, and in former days they were also common in Japan in winter. On their occurrence in Japan past and present Prof. Ijima writes to me that *A. leucauchen* and *G. monachus* were the commonest species of Crane in Japan in former days, but both as migrants only. The Shōgun used to protect these birds, much to the distress of the people, who were not allowed to molest them whatever harm they might do to their crops. For killing one of them capital punishment was inflicted. At the time of their arrival, in autumn, a large number of men were employed to scatter food about for them and to accustom them to the approach of man. The Shōgun himself used to hawk them and every year the first Crane thus captured was dispatched to Kyoto to be presented to the Emperor. *A. leucauchen* seems to have been the species that the Shōgun used to pursue in the neighbourhood of Tokio, then Yedo. Since the fall of the feudal princes no protection has been given to these birds, and consequently they have rapidly ceased to visit the country. Now-a-days they are so rare that, as with other Cranes, their occasional appearance is specially noticed in the newspapers.

These Cranes leave their winter quarters very early in the season. Prjevalsky found them arriving about Lake Hanka in the beginning of March, when the snow was still on the ground and the night frosts were very severe. The principal arrivals, however, were about the middle of March; the birds beginning to take up their position in pairs early in April when the marshes become free from ice. Dr. Dybowski saw them arrive at Darasun on the 20th April, and Père David mentions their passing regularly in spring and autumn in small numbers near Peking over the northern parts of the province of Tchéli. Taczanowski obtained in March two females of this species from Corea, near Seoul. Canon Tristram informs me that in 1891 he believes he saw some of these birds pass over Mogi at the south entrance of the inland sea in Japan in 1891 going north.

1) Jaarboekje Natura Artis Magistra, 1871, p. 199.

The Zoological Society of Amsterdam received the first specimens of the White-necked Crane in 1869, and has since never been without one or more examples of this species. The Zoological Society of London obtained the first birds in 1873. This species is rare in collections, and is never received in large numbers, the principal importer of them being Mr. William Jamrach. In continental Gardens, Amsterdam excepted, it is only occasionally found, in fact I can only remember having seen it at Antwerp and Berlin. In private collections I saw a beautiful specimen in the late Capt. E. W. Marshall's menagerie at Great Marlow in 1893, and in the autumn of 1894 there were four or five in splendid condition in the Cranery at Lilford Hall.

These birds bear confinement well, and do not mind the roughness of the winters of Western Europe.

The voice of this species, though different from that of *A. leucogeranus* is more akin to it than to that of other Cranes. When it screams its movements also slightly resemble the exagerated antics of that same species. To my mind these two species are very near related.

The plate represents a pair of old birds and a young one born in confinement living in the Zoological Gardens of Amsterdam in 1872.

I have not not been able to get a specimen of sternum with trachea undoubtedly belonging to the present species.

THE ASIATIC WHITE CRANE.

14.

THE WHITE CRANE

ANTHROPOIDES LEUCOGERANUS

PLATE XIV.

GRUS LEUCOGERANUS, Pall. Reis. Russ. Reichs, II. Anhang, p. 714 tab. F. (1773) — id. Zoogr. Rosso-As. II. p. 103 (1811) — Wagl. Syst. Av. *Grus*, sp. 5 (1827) — Temm. Pl. col. V. pl. 467 (1829) — Gould, B. Eur. IV. pl. 271 (1837) — Keys. & Blas. Wirb. Eur. pp. LIX, 206 (1840) — Nordm. in Démidoff's Voy. Russ. Mér. III. p. 266 (1840) — Gray, List *Grallæ* Brit. Mus. p. 74 (1844) — id. Gen. B. III. p. 552 (1845) — Temm. & Schleg. Faun. Jap. p. 118, pl. 73 (1850) — Schrenck, Reis. Amurl., Vög. p. 407 (1859) — Irby, Ibis, 1861 p. 243 — Swinh. P. Z. S. 1863, p. 308 — Radde, Reise Sibir., Vög. p. 312 (1863) — Jerd. B. Ind. III. p. 663 (1864) — Schleg. Mus. P.-B., *Ralli*, p. 5 (1865) — Degl. & Gerbe, Orn. Eur. II. p. 277 (1867) — Blyth, Ibis, 1867, p. 166 — Hume, Ibis, 1868, p. 28 — Brooks, Ibis, 1869 p. 237 — Elwes & Buckl. Ibis, 1870, p. 333 — Fritsch, Vög. Eur. taf. 41, fig. 1 (1870) — Swinh. P. Z. S. 1871 p. 403 — A. Anderson, t. c. p. 677 — Gray, Handl. B. III. p. 25, no. 10088 (1871) — Schleg. Jaarb. Natura Artis Magistra, 1872, p. 173 — Elwes, P. Z. S. 1873, p. 649 — Severtz. Turkest. Jevotn. p. 68 (1873) — Hume, Str. Feath. I. p. 235 (1873) — Tacz. Bull. Soc. Zool. Fr. I. p. 247 (1876) — David & Oust. Ois. de la Chine, p. 436 (1877) — Prjevalsky in Rowley's Orn. Misc. III. p. 47 (1877) — Dresser, B. Eur. VII. p. 359, pl. 507 (1878) — Blakist. & Pryer, B. Jap. p. 121 (1882) — Butler, Str. Feath. VII. p. 187 — id. Cat. B. Sind &c. p. 60 (1879) — Seebohm, Ibis, 1879, p. 149 — Hume, Str. Feath. VIII. p. 112 (1879) — Danford, Ibis, 1880, p. 94 — Hume & Marsh. Game-B. Ind. III. p. 11, pl. 2 (1880) — Reid, Str. Feath. X. p. 67 (1881) — Tegetm. & Blyth, Monogr. Cranes, p. 38 (1881) — Seebohm, Ibis, 1882 p. 226 — Forbes, P. Z. S. 1882 p. 352 — Blakist. Amended List B. Japan, pp. 12, 42 (1884) — Bogdanow, Consp. Av. Imp. Ross. p. 108 (1884) — Radde, Orn. Caucas. p. 391 (1884) — Seebohm, Ibis, 1884, p. 177 — id. B. Jap. Emp. p. 349 (1890) — Styan, Ibis, 1891, pp. 329, 502 — Eagle-Clarke, Ibis, 1891 p. 635 — id. Ann. Scot. Nat. Hist. I. p. 71 (1892).

ARDEA GIGANTEA, S. G. Gmel. Reis. Russl. II. p. 189 (1774).

GRUS GIGANTEA, Vieill. Nouv. Dict. d'Hist. Nat. XIII. p. 558 (1817).

ANTIGONE LEUCOGERANUS, Reichenb. Handb. Fulic. Novit. taf. CIV. figs. 2859, 2860 (1852).

LEUCOGERANUS GIGANTEUS, Bp. Cat. Coll. Parzud. p. 9 (1857).

GRUS POLII, Yule, Book of Ser Marco Polo, I. p. 262 (1871).

SARCOGERANUS LEUCOGERANUS, Sharpe, Bull. B. O. C. I. p. XXXVII. (1893) — id. Cat. B. Brit. Mus. XXIII. p. 261 (1894).

Vernacular names. The Asiatic White Crane (English); de Witte Aziatische Kraanvogel (Dutch); der Weisse indische Kranich (German); la Grue blanche d'Asie (French); Shiratsuru or Sodeguro (Japanese).

Adult. Pure white, primaries and primary-coverts black, spurious wing also black. Bare skin of the head extending till just over the eyes, covered with a few white hairs on the front and with black ones where the naked skin meets the white feathers of the crown or of the lower mandible. Legs flesh colour. Iris sulphur yellow. Female similar but smaller. Size of the male, wing 26 inches, tail 8′, tarsus 11′, middle toe & claw $5\frac{1}{4}$′, culmen $8\frac{1}{4}$′.

Immature. All the white mixed with cinnamon brown the outward part of the feathers being of that colour. (Specimen in the Leiden Museum).

Chick. I have not seen a chick of this species nor found the description of one, but it probably resembles the chick of *Anthr. leucauchen.*

Egg. Figured of the natural size plate XVIII n°. 5 from a specimen laid in the Zoological Garden of Amsterdam.

Hab. From South-eastern Europe and Asia Minor eastwards to North-eastern China and the Amoor, wintering in North-western India and in China.

This Crane was first properly described and figured as a separate species by Pallas in the appendix to his "travels in the Russian Empire". So far as is known at present, its regular breeding-or summer-range extends over the marshes

and steppes of Central Asia from the Ural to the Japanese sea between the 40th and 60th northern parallels. In this vast extent we find it mentioned by Bogdanow as occurring in the northern parts of the Aralo-Caspian region, in the steppes of the Irtysch, the Ichim, the Baraba, Russian Dsjungaria and the Tians-shan, Dauria and the Ussuri country. Pallas recorded its having been found on the Obi and on the Lena, without defining a more exact locality. Radde found it breeding in small numbers in Northern Mongolia. Père David says it breeds in the Chinese province of Liau-tung, which borders Korea, and Prjevalsky met with a few breeding pairs in the neighbourhood of Lake Chanka. Schrenck found it on the Amoor near the mouth of the Gorin River. Severtzoff mentions it as perhaps breeding in Turkestan, but gives no actual proof of its doing so.

The only description of the nesting of this species is that given by Pallas in 1773. He informs us that the nest is composed of grass and is placed amongst reeds and rushes, that the eggs, two in number are laid in May, and that the male defends its mate against dogs and enemies of all sorts.

A pair of these birds bred in the Zoological Garden of Amsterdam. They constructed a large nest of straw, and both male and female sat on their two eggs for several weeks. Unfortunately nothing came of this attempt, the eggs proving unfertile.

The White Crane is a migratory bird which leaves its breeding quarters in the north, probably towards the end of September or during the month of October. On their way to the south they were observed in large flocks by Radde near the Tarei-Nor, and by Prjevalsky in October on the Koko-Nor. They migrate in three directions. Some of them winter in the Lower Yangtse basin, according to Styan, and these are probably the birds which breed in Eastern Siberia, around Lake Hanka and in the Liau-tung province. Others, probably those from the centre of Asia, travel southwards through Thibet and Turkestan to the lakes of the Himalayas and from there to the of plains of North Western India, sometimes even wandering as far south as the Central Provinces. A specimen is stated to have been killed at Koohee twenty miles south east of Kampti (near Nagpur) on February 3rd (21° N. lat.).

An excellent account of the occurrence of this Crane in India is given by Hume in his work on the Game-birds of India, Burmah and Ceylon. He informs us that it begins to appear in the Himalayas about the middle of October, arriving a week later in the plains of North-western India. It has been observed at Oudh, in many parts of the North Western Provinces north-east of the Jumna, at Dehree on Soane, at the Najafgurh Lake south of Delhi, at Kurnal, at Hansi, in Northern Sindh west of the Indus and in Eastern Narra. It is rare in the extreme Eastern Punjab. Hume informs us it is a very water-loving bird when in India, and that the only places where it is to be found are in the 'jhils' or shallow lakes, and the marshes. "A broad straggling belt of Dhák (*Butea frondosa*) jungle, some ten miles in width, at "one time doubtless continuous, but now much encroached upon and intersected in many places by cultivation, runs down "through nearly the whole of the "Doab", marking, possibly, an ancient river-course. Just where the northern and southern "boundaries of the Etāwah and Mynpoorie Districts lie within this belt, the latter encloses a number of large shallow ponds "or lakes ("jhils" as we call them), which covering from two hundred acres to many square miles of country each, at the "close of the rainy season, are many of them still somewhat imposing sheets of water early in January, and some few of "them of considerable extent even as late as the commencement of March..... There will always be, at any particular "time, two or three "jhils", that for the moment the Cranes particularly affect, and these are, as a rule, just those that "then happen to average about eighteen inches to two feet in depth, and that have a good deal of rush (*Scirpus carinatus* "amongst others) somewhere in the shallower parts."

"To this tract of country they make their way as early as the 25th October (and possibly sooner, though this is "the earliest date on which I have observed them), and there they remain at least as late as the end of March, or per- "haps a week or two longer. During the whole of our cold season they stay in this neighbourhood; and though growing "more and more wary (if possible) each time they are fired at, and disappearing for a day or two from any "jhil", where "an attempt has been made to kill or capture them, they never seem to forsake the locality until the change of tempe- "rature warns them to retreat to their cool northern homes. Week after week I have noticed, and repeatedly fired at, "sometimes even slightly wounded, particular birds, which have nevertheless remained about the place their full time; nay, "I have now twice killed the young birds early in the season, and the parents, one by one, at intervals of nearly a "couple of months.

"The Buhelias, a native caste of fowlers (and, I fear I must add, thieves), of whom there are many in the neigh- "bourhood, and who are keen observers of all wild animals, assure me that, as far back as any of them can remember "(namely, for at least the last fifty years), parties of the White Crane, or as they call them *karekhurs*, have been in the "habit of yearly spending their winters in the same locality. Though occasionally in larger flocks, it is usual to find either "a pair of old ones accompanied by a single young one or small parties of five or six, which then, as far as I can judge, "consist exclusively of birds of the second year. The fully adult birds are, even when they first arrive, of a snowy white- "ness; and each pair is almost without exception accompanied by a single young one, which when first seen is of a sandy

"or buff tint throughout, and very noticeably smaller than its parents. They never appear to have more than one young "one with them; but it does not at all follow that they do not lay more than one egg. Our commonest Indian crane, "which usually lays two and sometimes, though rarely, three eggs, and which has no long or arduous journey to perform, "seldom succeeds in rearing more than a single young one. Judging from those of its congeners which are best known "to me — *G. antigone* and *G. australasianus* — as also of what is recorded of the Common and Demoiselle Cranes "(whose nests I have never myself taken), I should suppose that they lay two eggs; but, if this be the case, I can "only say that out of more than a hundred pairs that I have seen from first to last, I never yet saw any with more than "one young one.

"The watchful care and tender solicitude evinced by the old birds for their only chick is most noticeable. They "never suffer the young one to stray from their side, and, while they themselves are seldom more than thirty yards apart, "and generally much closer, the young, I think, is invariably somewhere between them. If either bird find a particularly "promising rush-tuft, it will call the little one to its side by a faint creaking cry, and watch it eating, every now and then "affectionately running its long bill through the young one's feathers. If, as sometimes happens, the young only be shot, "the old birds, though rising in the air with many cries, will not leave the place, but for hours after, keep circling round "and round high out of gun — or even rifle — shot, and for many days afterwards will return, apparently disconsolately, "seeking their lost treasure.

"Like the Sárás, these birds pair, I think, for life; at any rate, a pair, whose young one was shot last year, and "both of whom were subsequently wounded about the legs, so as to make them very recognisable, appeared again this "year, accompanied by a young one, and were at once noticed as being our very friends of the past year by both the "native fowlers and myself. I was glad to see they were none the worse for their swollen, crooked, bandy legs; and this "year at least they have got safe home, I hope, with their precious charge.

"Throughout their sojourn here the young remain as closely attached to their parents as when they first arrive; "but, doubtless by the time the party return to their northern homes, the young are dismissed, with a blessing, to shift "for themselves. Long before they leave, the rich buff or sandy colour of the young bird has begun to give place to "the white of the adult plumage, and the faces and foreheads, which (as in the Common Crane) are feathered in the "young, have begun to grow bare. This, I notice, seems to result from the barbs composing the vanes of the tiny "feathers falling off and leaving only the naked hair-like shafts.

"Each year small parties of birds are noticeable unaccompanied by any young ones, and never separating into "pairs. These, when they first come, still show a few buff feathers, and have a dingy patch on the tarsus; and though "before they leave us they become almost as purely white, and have almost as well-coloured faces and legs as the old "ones that are in pairs, they never seem to attain to the full weight of these latter. From these facts I am disposed to "infer that these parties, which include individuals of both sexes, consist of birds of the second year, that our birds do "not either breed or assume their perfect plumage till just at the close of the second year, and that, like pigeons and "many others, they do not attain their full weight until they have bred once at least.

"Unlike the four other species of crane with which I am acquainted, *G. leucogeranus* never seems to resort, during "any part of the day or night, to dry plains or fields in which to feed; and, unlike them too, it is exclusively a vege- "table-eater. I have never found the slightest traces of insects or reptiles (so common in those of the other species) in "any of the twenty odd stomachs of these White Cranes that I have myself examined. Day and night they are to be "seen, if undisturbed, standing in the shallow water. Asleep, they rest on one leg, with the head and neck somehow "nestled into the back; or they will stand like marble statues, contemplating the water with curved necks, not a little "resembling some White Egret on a gigantic scale; or, again, we see them marching to and fro, slowly and gracefully, "feeding among the low rushes. Other cranes, and notably the Common one and the Demoiselle, daily pay visits in "large numbers to our fields, where they commit great havoc, devouring grain of all descriptions, flower shoots, and "even some kinds of vegetables. The White Crane, however, seeks no such dainties, but finds its frugal food — rush seeds, "bulbs, corns, and even leaves of various aquatic plants — in the cool waters where it spends its whole time. Without "preparations by me for comparison, I hardly like to be too positive on this score; but I am impressed with the idea "that the stomach in this species is much less muscular than in any of the others with which I am acquainted. The "enormous number of small pebbles that their stomachs contain is remarkable. Out of an old male I took sufficient very "nearly to fill an ordinary-sized wineglass, and that, too, after they had been thoroughly cleaned and freed from the "macerated vegetable matter which clung to them. These pebbles were mostly quartz (amorphous and crystalline), green- "stone, and some kind of porphyritic rock; the largest scarcely exceeded in size an ordinary pea, while the majority "were not bigger than large pins' heads. Perhaps, in the hands of some abler mineralogist than myself, these tiny frag- "ments (of which I have a small bag full) may prove to contain as yet unnoticed mineral forms from Central Asia. I "have found similar pebbles in the stomachs of the Grey and Demoiselle Cranes, but never in anything like such numbers

"as in those of the present species. When shot, the White Cranes are worth nothing as food, which, considering their "diet here, is not surprising".

A third winter resort of the White Crane is the coasts of the Caspian Sea, where it has been recorded by Pallas and by Nordmann as found at this season, and Asia Minor where it was seen in a flock of a hundred in the fields bordering the Kisil Irmak River by Danford.

In Japan Prof. Ijima kindly informs me, this Crane has always been of extremely rare occurence, and must be regarded as a scarce straggler on migration. The only specimens from that country which I know of in Europe are the three in the Leiden Museum sent there by von Siebold and figured in the 'Fauna Japonica'.

In March the White Cranes leave their winter-quarters and travel northwards in flocks. Those from the shores of the Black Sea seem to pass regularly over the Ekaterinoslaw Government, where they were recorded by Nordmann. Seebohm saw "flocks of hundreds in the plains" near Astrachan at the mouth of the Volga and it is probable that these were birds that had wintered round the Caspian.

The Indian birds and those that winter in the Yangtse basin observe the same time for their travels to their breeding quarters. In North-eastern Asia in 1858 Radde found flocks of them north of the Bureja mountains in the month of April and in the plains even as early as the 24th March.

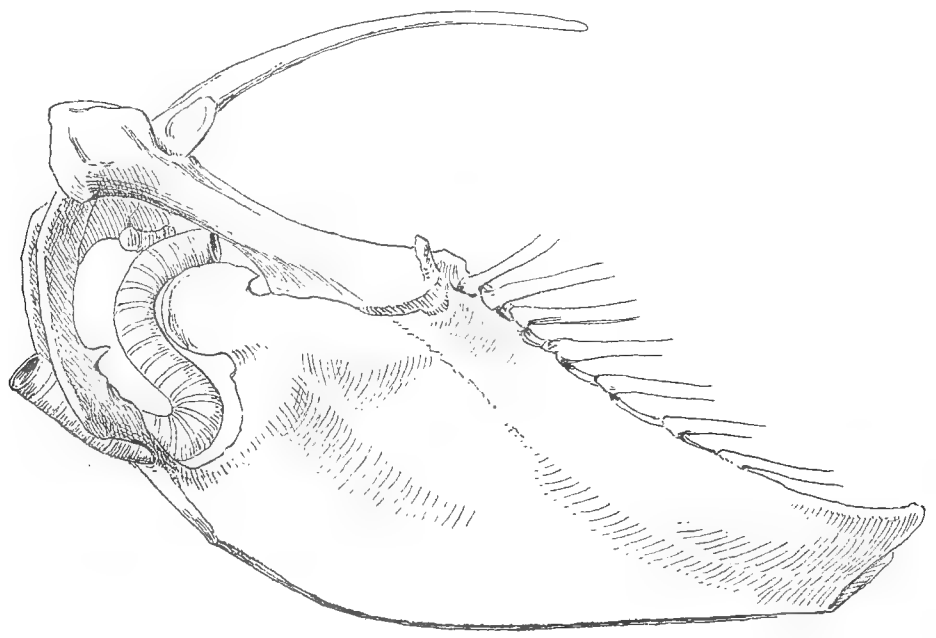
The Zoological Society of Amsterdam received the first specimen of this Crane in 1871, whilst the Zoological Society of London had the first specimen presented to them in 1868 by the Babu Rajendra Mullick of Calcutta. Since that time both collections have rarely been without specimens of this beautiful species. In other continental Gardens these birds are also usually exhibited, being rather regularly imported by Mr. William Jamrach from Northern India. I have seen fine specimens of it in the Crane-collection of the late Capt. E. W. Marshall at Great Marlow, and one of his birds which flew away, and was after a while captured at Barra in the Outer Hebrides, at first gave rise to the supposition of its having come there on its own account from Eastern Europe, whereas it had in reality travelled the greater part of the way in one of Mr. Jamrach's boxes.

This bird has a very peculiar and rather melodious cry, and a very original movement of its body whilst putting it forth. It moves its head and neck backwards and forwards and the wings up and down at the same time, and the more excited it gets, the quicker those curious movements become. Generally both sexes join in this exercise. Besides this peculiar and rather melodious cry they have the harsh trumpeting call usual with most Cranes, only the voice is not quite so strong.

The flight of this bird, as observed in the case of Capt. Marshall's fugitive when at Barra, is described by Dr. John MacRury as slow and steady like that of the common Heron, the bird uttering, now and then, a plaintive whirring note.

The trachea of this species closely resembles that of the Wattled Crane. The specimen figured is preserved in the Zoological Museum of Berlin [1]).

1) It has been stated this species sometimes possesses a convoluted trachea, but of the rather numerous specimens I have examined all were like the one figured so that I think it rather doubtful whether so called specimens with convolutions entering into the keel of the sternum really belonged to this species.



Trachea of Anthropoides leucogeranus.

THE BALEARIC CRANE.

15.

THE CROWNED CRANE

BALEARICA PAVONINA

PLATES XV, XVa.

DE KROONVOGEL, Bosman, De Guineesche Goud-, Tand- en Slavenkust, II. p. 45. pl. 43. no. 11 (1704).
THE CROWNED AFRICAN CRANE, Edwards, Nat. Hist. B. IV. p. 192. pl. 192 (1751).
L'OISEAU ROYAL, Briss. Orn. V. p. 511, pl. XLI. (1760).
ARDEA PAVONINA, Linn. Syst. Nat. I. p. 141 (1760) et ed. XII. I. p. 233 (1766) — Gmel. Syst. Nat. I. p. 619 (1788) — Vieill. Gal. Ois. suppl. pl. 17 (1825).
ANTHROPOIDES PAVONINA, Vieill. Nouv. Dict. d'Hist. Nat. II., p. 165 (1816), id. Gal. Ois. II. pl. 257 juv. (1834) — Bennett, P. Z. S. 1833, p. 118.
CROWNED HERON, Lath. Gen. Syn. III. pt. 1. p. 34 (1785).
GRUS BALEARICA, Vieill. Nouv. Dict. d'Hist. Nat. XIII. pp. 557, 560 (1817).
BALEARICA PAVONINA, Children in Denham & Clappert. Travels, II. App. p. 200 (1826) — Less. Tr. d'Orn. p. 588 (1831) — Gray, Gen. B. III. p. 553 (1845) — Rüpp. Syst. Über. p. 120 (1845) — Bp. Consp. II. p. 102 (1854) — Heugl. Syst. Über. p. 57 (1856) — Hartl. Orn. Westafr. p. 218 (1857) — Tristr. Ibis, 1860 p. 76 — Wright, Ibis, 1864 p. 142 — Antin. Cat. desscr. Ucc. p. 100 (1864) — Keulemans, Tijdschrift voor de Dierk. p. 372 (1866) — Loche, Expl. Sci. Algér., Ois. II. p. 146 (1867) — Doderl. Avif. Sicil. p. 208 (1869) — Saund. Ibis, 1871 p. 390 — Gray, Handl. B. III. p. 25, no. 10094 (1871) — Heuglin, Orn. N. O. Afrik. II. pt. 1. p. 1258 (1873) — Ussher, Ibis, 1874 p. 73 — Brehm, Thierleben, Vög. III. p. 398 (1879) — Schmidt, P. Z. S. 1880, p. 316 — Gigl. Ibis, 1881 p. 186 — Tegetm. & Blyth, Monogr. Cranes, p. 19 (1881) — Hartert, J. f. O. 1886, p. 608 — Salvad. Elench. Ucc. Ital. p. 241 (1887) — Sharpe, Cat. B. Brit. Mus. XXIII. p. 272 (1894).
GRUS PAVONINA, Wagl. Syst. Av. *Grus*, sp. 1 (1827) — Schleg. Mus. P.-B. *Ralli*, p. 7 (1867) — Huxley, P. Z. S. 1867, p. 429 — Finsch. & Hartl. Vög. Ost-Afr. p. 667 (1870) — R. Gray, Ibis, 1872, p. 201.
GERANARCHUS PAVONINA, Gloger, Handb. Naturg. p. 438 (1842).

Vernacular names. The Balearic Crane, the Crowned Crane (English); de Kroonkraan, de Kroonvogel (Dutch); l'Oiseau royal, la Grue couronnée (French); der Pfauenkranich (German); Gauraka (Haussas).

Adult. General colour above and below, dark slaty grey passing into black, especially on the upper parts, where the feathers are pointed and more or less falcated. Wing coverts white, the inner greater coverts straw-coloured and composed of disintegrated plumes; bastard wing and primary coverts white. Primaries black, secondaries maroon-chestnut, the innermost ones a little broadened and lengthened and slightly decomposed. Tail-feathers black. Crown of head covered with a patch of velvety black feathers; occiput with a tuft of straw-like bristles tipped with black; lores, sides of face and cheeks bare; the upper half white, the lower half pink. Throat covered with black downish feathers, middle of throat bare, covered with a red skin with a fold in the middle which is of the shape and of about double the size of a coffee-bean, the fold running vertically across the throat. Neck feathers, especially those of the lower neck in front, elongated and lanceolate and a little lighter than the back. Bill black; iris white; legs black. (From a living bird in the Zoological Garden of Amsterdam). Wing 22′, tail 10′, tarsus 7½′, middle toe & claw 4½′, culmen 2½′. (Specimen in the Leiden Museum).

Immature. General colour, above and below, blackish, the feathers of the upper parts broadly edged with rufous and those of the underparts with broad sandy buff margins. Primaries and secondaries as in the adult, but with black ends to the maroon secondaries. All the white wing-coverts broadly margined with rufous and black subterminal markings. Head and neck sandy rufous; crown of head chestnut with black bases to the downy feathers. Lores bare. Rest of sides of face and ear-coverts covered with isabelline down. (Description and figure, Plate XVa, from a skin in the Leiden Museum).

Chick. Underparts covered with yellowish down, upperparts with dark brown and chestnut markings, darkest just above the tail. Crown of bristles indicated by a patch of somewhat lengthened brownish down. (The figure, Plate XVa, and description from a chick a few days old, bred in the Zoological Garden of Amsterdam).

Egg. Of a uniform pale blue, two or sometimes three in number.

Hab. West Africa from the sea coast north of the Equator, east to Abyssinia and the tributaries of the Nile.

This beautiful Crane was first brought alive to Europe by the Portuguese in the 15th century. Aldrovandus gives us a very good figure of it, taken from a drawing, which he tells us, he received from Rome from his grand-son Julianus Griffonius. The birds in question were brought to Italy from Portugal, having been imported there from Cape Verde, and were kept in Rome in the Gardens of Cardinal Sfortia about the year 1603. It is specially noted that these birds roosted on trees or on small elevations of the ground. A beautiful representation of this bird is also to be found in the picture of de Hondecoeter about the end of the 17th century in the National Museum at Amsterdam, which has already been mentioned.

From Willem Bosman, who lived several years on the Gold Coast and wrote on its products, we learn that Crowned Cranes were in great demand in his days (about 1700) for export to Holland where they were kept tame by the wealthy merchants of Amsterdam in their parks and gardens.

It is unfortunate that the generic name *Balearica* has been generally adopted for the two Crowned Cranes, as there is no proof that these birds have ever occured in the Balearic Islands, and at the present time (as has been ascertained by Mr. Howard Saunders) there certainly is not a single authentic specimen from that locality in any collection. To suppose that the Crane, referred to by Pliny as the 'Balearic Crane', was this species is certainly an error. So far as I can make out, Pliny's 'Lesser Crane of the Balearic Islands' was the Demoiselle Crane. His statement that the Balearic Crane and the Black Woodpecker both have a crest fortifies me in this supposition. The little white eartufts of the Demoiselle are somewhat similar in form to the red crest of the woodpecker, but certainly not at all like the Crown of bristles of the Crowned Crane. Nobody could have compared those two objects and found them similar.

Edwards, Brisson and Latham all described and figured this Crane as the female of the following species.

The distribution of this Crane extends all across Africa, north of the Equator, from Senegal on the west coast to the tributaries of the Nile and Abyssinia on the east. In the Algerian Sahara it is probably only a straggler. It was seen there once by Canon Tristram on the dry sands of the Guerah-el-Tharf in the month of April. There is no authentic proof of its ever having occurred in Europe, and all serious researches on this point have led to negative results. On its so-called occurrence in the Balearic Islands Mr. Howard Saunders writes: — "I am not aware of the existence of a single "authentic specimen of *Balearica pavonina* either on the Mainland of Southern Spain or in the Balearic Islands. The only "notice of its ever having occurred in the latter is contained in the list of my friend Don Francisco Barceló y Combis, "who, however, assured me personally that no specimen had been obtained within his recollection. The evidence upon "which this species has been christened '*Balearica*' is as follows: — Don Buenaventura Lerra, who died in 1784, states "in his work on the natural history of the Balearic Islands that *he had heard* it said that in 1788 a specimen of this bird "was obtained at Santa Ponsa, which passed into the hands of Don Cristobal Villela". Prof. Giglioli also came to a negative conclusion as regards the occurrence of this bird in Italy, and says that it ought to be excluded from the list of Italian birds.

A specimen of this Crane shot near Dabry in Ayrshire in 1870 was of course an escaped bird; the emptiness of its stomach, when it was shot, goes far to prove this.

In West Africa the Crowned Crane probably also visits the Cape Verde Islands, at least I find it mentioned by J. G. Keulemans that he had heard from the natives that this bird is a regular migrant to the small uninhabited islands of this group. The species is common in Senegambia and on some parts of the Gold Coast. Ussher found it rare on the Volta River, but frequent on the Gambia and on the Niger. Mr. Hartert informs me that he did not see this bird on the Niger and Benue in 1885 and 1886, but heard from Flegel that he had observed it now and then on the last-named river. He saw it frequently however, in the interior of the Haussa Empire from August 1885 to March 1886. The birds were mostly in flocks of from five or six up to many hundreds in number. On one occasion he says "having "wandered over a dry stony sandy plateau, when looking down in the valley with palm trees, silvery streams and "green pasture grounds, I called to my companion that I saw innumerable herds of red and white sheep, such as we had "seen before near Kashia, but when coming near enough I found they were all Balearic Cranes. This was the biggest lot "I ever saw, there were many hundreds and they were so shy that I could not shoot any. I found them generally rather shy "birds, but much less so when a few only were together. In such cases I have more than once ridden close enough on "horse-back, to knock one or two over with my shot gun, whilst out of bigger herds I could generally only procure any

THE BALEARIC CRANE, IMMATURE AND CHICK.

"with the rifle. The Haussas call the bird Gauraka, a very good onymatopæic name, as the very powerful call sounds "much like the word 'gauraka'. I have eaten the bird and found it quite eatable though not very tender".

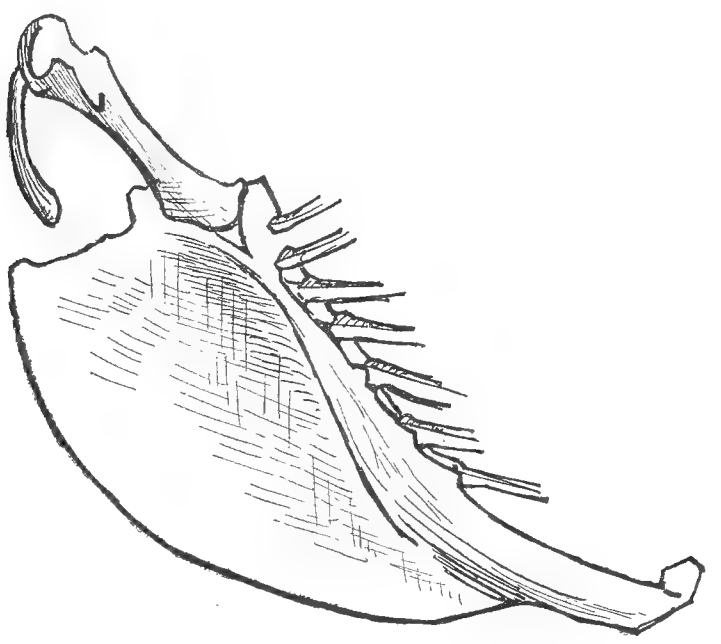
In Central Africa this Crane is found commonly on the banks of rivers and lakes. In the eastern part of the continent it is of ordinary occurrence from south of the 15th parallel to the Equator, as testified by von Heuglin, A. E. Brehm, and many others. Von Heuglin found it in very great numbers during the winter on the Tana Lake in Abyssinia but observed that it left the Dembea plain in April. On the Blue and White Nile he found it as far north as the 15th degree of northern latitude, but only during the rise of the river, also further to the west between the Gazelle and Djur rivers. Von Heuglin and A. E. Brehm alike observed that in the morning the birds went in search of food to the open plains, feeding on all sorts of vegetable matter, seeds as well as green things, and on snails, worms, insects, frogs, etc., and that when their hunger was satisfied they resorted to the borders and the sands of the river to drink, rest, and amuse themselves by dancing. Sometimes they would return for a second supply of food in the afternoon, but generally the morning meal seemed to be sufficient. Towards the night the large flocks separate into smaller troops to go to their roosting-places, which were generally in large trees. On this subject Brehm writes: — "On the Blue Nile the Crowned "Cranes appeared to spend the night on trees only. Some passing flocks showed me the direction I had to follow, and "after having gone for some minutes I began to hear the trumpet-calls of the noisy assembly. They made a great deal of "noise at their roosting-places, but the noise was so indistinct that I felt sure they must be a long way off. I had to go "for another quarter of an hour before reaching the birds, which I found to my astonishment, thirty or forty in number, "seated on the branches of a clump of trees, which stood isolated in the midst of the steppe, not a single bird was on the "ground". Von Heuglin made the same observations respecting this habit so remarkable in the case of birds of this family.

As to the breeding of this species in a wild state I find no reliable account of it. Von Heuglin was told they nest in trees, but I think this very improbable, as the Cape Crowned Crane nests in swamps, and no species of Crane is known to build on trees.

The Crowned Crane is not a migratory bird, the chief difference in its habits during the breeding season and out of it being that when the breeding season is over the birds assemble in large flocks and spread a little wider over the country.

The Zoological Society of Amsterdam received the first living example of *Balearica pavonina* in 1843, and the Zoological Society of London in 1860. Since these dates this bird has rarely failed to be exhibited in both these collections. They are usually to be seen in all the more important Zoological Gardens, and if treated properly live in confinement for many years. Buffon gives an elaborate account of a tame bird of this species kept in the Paris Menagerie. He found it very sociable and playful and he remarks that during the winter of 1778 it went every evening on its own accord to a heated room to spend the night, trumpeting loudly if it found the door shut.

In this species the trachea goes straight to the lungs without making convolutions or bending into the keel of the sternum. The sternum figured is a specimen preserved in the Museum of the Zoological Society of Amsterdam.



Sternum of Balearica pavonina.

THE CAPE CROWNED CRANE.

16.

THE CAPE CROWNED CRANE

BALEARICA REGULORUM

PLATE XVI.

THE CROWNED AFRICAN CRANE, pt. Edwards, Nat. Hist. B. IV. p. 192 pl. 192 (1751).
L'OISEAU ROYAL MÂLE, Daubent. Pl. Enl. VIII. pl. 265.
ANTHROPOIDES REGULORUM, Bennett, P. Z. S. 1833, pp. 118, 119.
GRUS REGULORUM, Licht. Kat. Vög. Kaffernl. p. 19 (1842) — Finsch & Hartl. Vög. Ost-Afr. p. 669 (1870) — Fisch. Zeitschr. ges. Ornith. I. p. 386 (1884).
BALEARICA REGULORUM, Gray, List *Grallæ* Brit. Mus. p. 75 (1844) — id. Gen. B. III. p. 553 (1845) — J. E. Gray, Knowsley Menag. pl. 13 (1851) — Reichenb. Handb. Fulic. taf. CCXVI, figs. 2855—56 (1852) — Bp. Consp. II. p. 102 (1854) — Kirk, Ibis, 1864, p. 331 — Layard, B. S. Afr. p. 304 (1867) — Gurney, Ibis, 1868 p. 255 — Layard, Ibis, 1869, p. 376 — Ayres, Ibis, 1871, p. 264 — Gray, Handl. B. III. p. 25, no. 10095 (1871) — Gurney in Andersson's B. Damaral. p. 279 (1872) — Ayres, Ibis, 1873, p. 286 — Buckley, Ibis, 1874, p. 389 — Garrod, P. Z. S. 1876, p. 277 — Barratt, Ibis, 1876, p. 209 — Ayres, Ibis, 1877, p. 348 — Schmidt, P. Z. S. 1880, p. 316 — Bocage, Orn. Angola, p. 435 (1881) — Holub & Pelz. Beitr. Orn. S.-Afr. p. 256 (1882) — Shelley, Ibis, 1882, p. 363 — Böhm, J. f. O. 1885, p. 52 — Fischer, t. c. p. 116 — Matschie, J. f. O. 1887, p. 145.
GRUS PAVONINA, Schleg. Mus. P.-B. *Ralli*, p. 7 (1865) — Böhm, J. f. O. 1882, p. 185.
ARDEA PAVONINA, Chapm. Trav. S. Afr. II. App. p. 417 (1868).
BALEARICA PAVONINA, (nec L.) Reich. J. f. O. 1887, p. 48 — Emin, J. f. O. 1891, p. 58.
BALEARICA CHRYSOPELARGUS, Tegetm. P. Z. S. 1880, p. 93 — id. et Blyth, Monogr. Cranes, p. 15 (1881) — Butler, Feilden & Reid, Zool. 1882, p. 342 — Reid, Ibis, 1883, p. 225 — Sharpe & Layard, B. S. Afr. p. 629 (1884) — Shelley, Ibis, 1888, p. 295 — Sharpe, Cat. B. Brit. Mus. XXIII. p. 274 (1894).
BALEARICA GIBBERICEPS, Reich. J. f. O. 1892, p. 126 — id. Die Vög. Deutsch Ostafr. p. 46 (1895) — Sharpe, Cat. B. Brit. Mus. XXIII. p. 275 (1894).
BALEARICA GIBBERIFRONS (lapsu), Reich. J. f. O. 1892, p. 462 (Index).

Vernacular names. The Cape Crowned Crane (English); de Kroonkraan van Zuid-Afrika (Dutch); la Grue couronnée du Cap (French); der Königskranich (German); Mahém (in South-Africa).

Adult. Similar to *Balearica pavonina* but of lighter colour. The feathers of the neck especially are pearly grey instead of slaty grey, and the crown-bristles and inner great wing-coverts are generally of a paler yellow than in *B. pavonina* each bristle being ringed with white and yellow. Throat naked, with a pendent wattle which is of a bright red colour, the base being black, in continuation of the velvety black feathers round the naked cheeks. Bare sides of the face usually white with a red triangle at the top, which is sometimes more or less swollen. Sometimes the white of the cheeks is not pure but is mixed with red and sometimes the cheeks are even nearly altogether red as I observed in a specimen in the Zoological Gardens of London in 1894, which was received from Beira. Iris greyish white: bill and legs blackish horn-colour. Wing 23″, tail 10½″, tarsus 8¼″, middle toe & claw 4¼″, culmen 2½″ (specimen in the Leiden Museum).

Immature. Similar to the young of *Balearica pavonina*. Ayres describes the bill as black, the base of the lower mandible being paler; bare skin between the bill and the eye black, the adjacent space which is occupied by the wattle in the adult clothed with short yellowish-white down, legs ashy black, iris light ash-colour.

Chick. Similar to that of *Balearica pavonina.*

Egg. Of a uniform pale blue without spots. Figured of the natural size plate XVIII nº. 6 from a specimen laid in the Zoological Garden of Amsterdam. The accounts which attribute a spotted egg to this species are doubtless founded upon error. Eggs of this Crane in the Leiden Museum are of the uniform colour as above described, and birds in confinement always lay pale blue eggs. The number of eggs is two or three.

Hab. South Africa, south of the 9th parallel, and up the east coast north to the Equator.

The first thing to be done with the present species is to restore to it the name '*regulorum*', of which it was deprived by Mr. Tegetmeier in 1880, and to cast away the inappropriate term "*chrysopelargus*" which was never meant for a Crane at all, but for the Black Stork.

The history of the present species is shortly as follows. — Edwards in his 'Natural History of Birds' recognized two forms of Crowned Cranes, but mistook them for male and female, taking *B. regulorum* for the male and *B. pavonina* for the female, and Buffon continued this error. The older Lichtenstein seems to be the first who specifically distinguished the Southern and the Northern Crowned Cranes — at any rate his son Professor Lichtenstein mentions this as being the case. His distinctions and appellations, however, seem never to have been published until, in 1833, Mr. E. T. Bennett, Vice-Secretary of the Zoological Society of London, exhibited at a Meeting of that Society several specimens of the two species of Crowned Cranes, with the view of settling the specific distinctness of the two forms. Mr. Bennett proposed to adopt for the Southern bird Lichtenstein's name '*regulorum*', retaining '*pavonina*' for the Northern form. Since that time the name '*regulorum*' has been generally used, until Mr. Tegetmeier, thinking that Lichtenstein's description [1]) of his Golden-Stork from Caffreland was applicable to the Cape Crowned Crane proposed to change its specific name to '*chrysopelargus*'. To everybody who reads Lichtenstein's description of *Ardea chrysopelargus* it will be evident that this description applies to the Black Stork (*Ciconia nigra*) which also occurs in South Africa, and not to the Crowned Crane of the Cape. The Cape Crowned Crane ought therefore to be called *Balearica regulornm* (Bennett) and the name '*chrysopelargns*' which was never meant for it should be placed amongst the synonyms of *Ciconia nigra*, as has been done already by Giebel and Dresser.

In a recent article in the "Journal für Ornithologie" Dr. Reichenow has proposed to separate the Crowned Crane of German East Africa from the Crowned Crane of South Africa, under the name "*gibbericeps*". This separation is based on the fact that in some specimens of this species from German East Africa the upper part of the naked skin of the white cheeks, which is generally coloured red, is more or less swollen. I have found, however, after careful examination, as well of living birds as of skins, that some living birds which undoubtedly come from South Africa have these parts more or less swollen, and that others from German East Africa have it often quite smooth. On examining skins, in which this so-called distinction is always much more visible than in living examples, I find the case for separation even worse, for in some specimens one side of the head has the skin smooth, whilst the other side has it apparently swollen. This is the case with an example from the Transvaal in the British Museum. If therefore Dr. Reichenow's specimens of Crowned Cranes from East Africa in the Berlin Museum all have these upper parts swollen, I simply attribute it to the way in which they have been prepared. If the skinner after turning back the skin over the skull draws it back sufficiently the typical *B. regulorum* is obtained; if this is not done and the upper part of the naked cheeks remains just over the pointed projections of the skull these parts seem to be swollen and the form named *B. gibbericeps* is produced. In the above-mentioned specimen in the British Museum the skin on one side has been drawn back properly, and on the other side has remained over the bony projection. I think this is the correct explanation of the difference of the two supposed species.

The Cape Crowned Crane is an inhabitant of South Africa but extends on the east coast as far north as the Equator and on the west coast as far as the Cuanza River or to somewhere about the 9th southern parallel. It is an inhabitant of the open plains, and usually frequents the neighbourhood of swamps and rivers. In some instances, as observed by Fritsch in the Harris Mountains, it seems to frequent the higher mountain lakes. Layard found this Crane tolerably common in the eastern parts of the Cape Colony, also in the northern and north-western parts of it. Ayres, Buckley, and Barratt met with it generally distributed over the Transvaal, and nests were found in November and December in swamps on the banks of the Mooi River, some 20 miles from Potchefstroom. Buttler, Feilden and Reid met

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1) *Ardea chrysopelargus*, nobis, Ardea oculorum area nuda; corpore supra item collo et pectore ex fusco aeneo; subtus albo. Rostrum fere 10 pollices longum, rubrum basi exalbidum. Nares lineares ultra 4 pollices longae, mandibulam superiorem in medio quasi sulco pervio dirimunt. Genae et collum purpureo nitore fulgent, reliquum corpus, quatenus ex aeneo fuscum est viridi splendore renidet. Remiges nigrae; rectrices supra sunt aeneae, infra ut venter et crissum albent. Pedes 29 pollices longi, pallide rubri. Digiti antici basi palmati, posticus brevis terram tamen attigens. Longitudo universa 4 pedum 6½ pollicum. Habitat in terra Cafrorum.

with it frequently in Natal, and were informed that it breeds in the neighbourhood of Newcastle, although they did not succeed in finding nests.

In Central South Africa Chapman met with this Crane on Lake Ngami. In the Mashoona country it was observed during Jameson's expedition in September and October, and Sir John Kirk found it all the year round on the Zambesi and Shiré rivers, and further to the north on Lake Nyasa. He informs us it is most numerous in the interior, but is seen in smaller numbers near the coast. Professor Barboza du Bocage also states that he received two specimens from the Zambesi. In German East Africa Böhm saw it in large troops, which in their flight observed a V-shape form, near Tabora and the neighbourhood of Gonda. Fischer found it on the Victoria Nyanza and it has also been recorded from Ugogo, Tabora, the Kilima-njaro district, Sigirari, the Masai plains, Ugalla, Igonda and Lake Naiwasha. On the west coast, in British East Africa, it has been procured near Humbe on the Cunene River by d'Anchieta, and Andersson found it on the rivers Botletlé, Teoughe and Okavango.

The Cape Crowned Crane constructs its nest in swamps or shallow lakes. The best description of its nidification I find in Holub and Pelzeln's "Beitrage zur Ornithologie Süd-Afrika's" where they state as follows: "In the southern "parts of the continent the breeding-season begins in the end of September or the beginning of October, whilst in the "Zambesi region it is a month earlier. They probably breed twice a year as a nest was found as late as the month of "March. The birds generally use a small island in the midst of a reed-grown swamp or pond of some extent, or form "one by treading down the reeds in a circumference of from 25 to 32 meters. The broken reeds and grasses are then "collected in a heap and, in the midst of this circle, are formed into a floating islet at the top of which the nest itself "is placed. The water round the nest is carefully cleared of all vegetation so that the nest is only accessible by water. "The circumference of the islet which is of a conical form is about 8 meters and the diameter of the depression in which "the eggs are placed half a meter, the depression itself being about 16 cm."

Mr. J. C. Bodenstein found a nest of this Crane on the 22nd December in an extensive swamp on the banks of the Mooi River, 20 miles from Potchefstroom in the Transvaal. It was composed of rushes pulled up and placed in a conical form on the long rank grass, which falls down from its own weight and forms a carpet of vegetation often more than a foot thick. The nest was built where the water was about ankle-deep. Ayres found a nest of the same description placed in shallow water in a pool near Potchefstroom, while Buckley describes the nest that he found as composed of dried reeds, and floating in the way mentioned by Holub and Pelzeln.

As to the period of incubation in a wild state I find no information, but a pair of birds of this species in confinement in the Zoological Garden of Amsterdam sat on their eggs for twenty-eight days, at the end of which two young ones were hatched The little birds were tended by their parents in the same way as with other Cranes, but unfortunately died when five days old. As the nest is usually constructed in the midst of water, the chicks must swim from it to reach terra firma. This agrees with what I have observed in the case of the young of *Grus japonensis*, bred in confinement, which followed their parents through water of about a yard deep, swimming like young ducks.

Barratt informs us these birds never breed more than one pair together in the same vley, and in this respect they resemble the true Cranes.

The Cape Crowned Crane is not a migratory bird. In most places where they are found they may be seen all the year round. The only difference in the mode of their occurrence during the different seasons is, that after the breeding-season the birds assemble in small parties or sometimes even in large flocks, and frequent the open plains often in company with Stanley Cranes. In the breeding-season they are found in the vleys, and in general in the neighbourhood of swamps, rivers and lakes in pairs only. Out of the breeding season the flocks after having spent the day feeding in the grassy plains, resort to shallow ponds to pass the night in the water. Sometimes they may spend the night (as observed by Böhm near Gonda in Central Africa) in isolated trees. As A. E. Brehm observed this same fact as regards *Balearica pavonina* on the Blue Nile I find no reason to doubt this statement, strange at it may seem.

In its native haunts the Crowned Crane is a very wary bird, so that it can only be obtained after a very difficult stalk. It feeds on various insects, small reptiles, fishes, and grain and other vegetable matter. Like the Demoiselle Crane the Crowned Crane excels in graceful dances during which the beautiful markings of the wing become very conspicuous.

The voice of this Crane is loud but not unmelodious, and is not badly translated by the word "*Mahém*". Holub describes it, when heard from a flock on the wing, as not unlike the tones of a large Aeolian harp.

The Zoological Garden of Amsterdam received the first specimen of this Crane in 1845, and the Zoological Society of London in 1851. Since that time this species has generally been represented in both collections as well as in other Zoological Gardens on the continent and in private collections. The birds live well in confinement and become extremely tame, often even agressive to strangers. I recollect some years ago when staying with the late M. J. Cornély of Tours, that a Roman Catholic priest, who had come to see the beautiful collection of living birds of my host, was attacked in the park by a tame bird of this species. The bird behaved so badly that the soutane of the poor man was

torn open from top to bottom. The priest was in despair, being rather fearful of meeting the eyes of his flock in the streets of Tours in his disordered attire, and applied to the charity of Madame Cornély, whose needle soon repaired the evil that the pet Crane had done.

In the Zoological Garden of Ghent I am told a pair of these Cranes have bred and successfully reared two young ones. In the Amsterdam Garden a female of this species paired with a male of *Balearica pavonina* and eggs were laid and hatched but the chicks did not live.

The trachea of *B. regulorum* resembles that of *B. pavonina*.

FLOCKS OF GRUS VIRGO ON THE BANKS OF THE NILE. after Sketch by Prof. Flower.

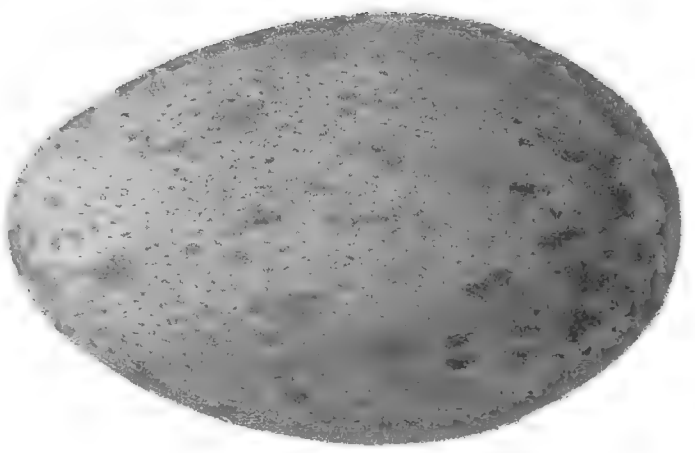


Fig. 1.

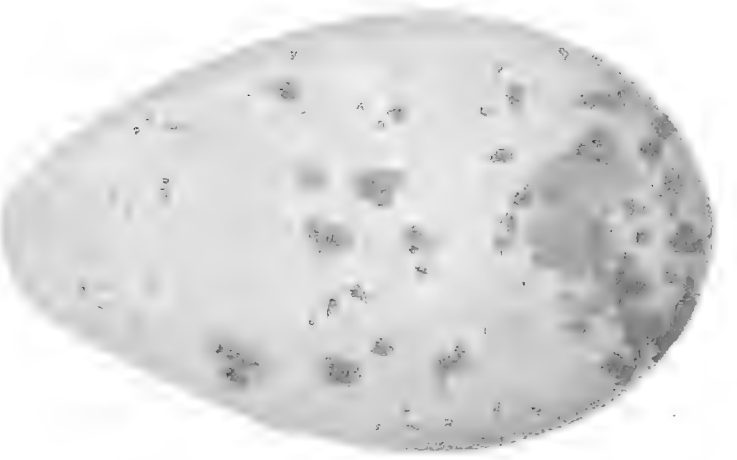


Fig. 2.

Fig. 3.

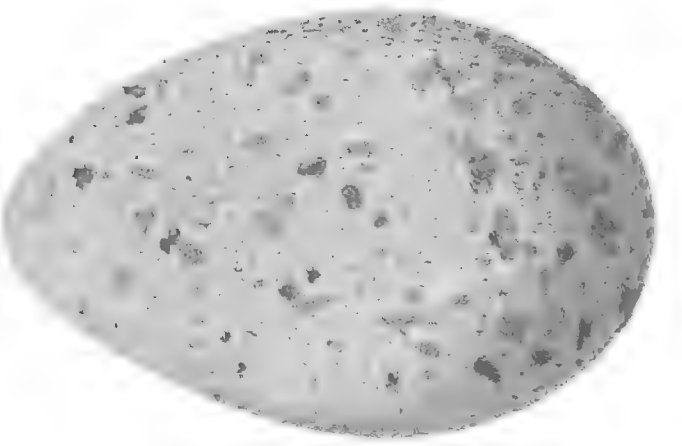


Fig. 4.

Fig. 5.

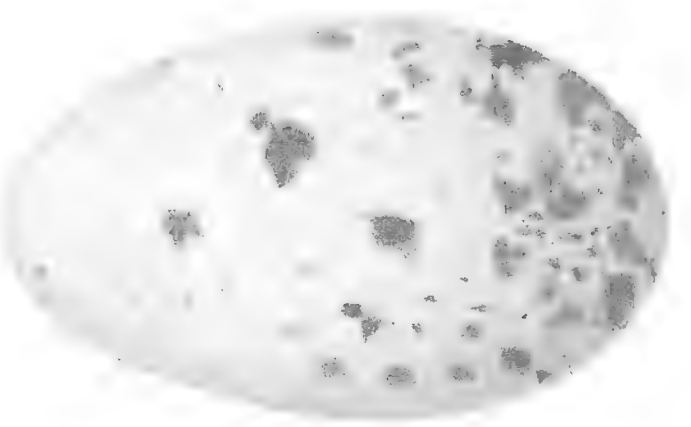


Fig. 6.

EGGS:

fig. 1, *Grus communis.*
fig. 2, *Grus japonensis.*
fig. 3, *Grus americana.*
fig. 4, *Grus canadensis.*
fig. 5, *Grus antigone.*
fig. 6, *Grus australasiana.*

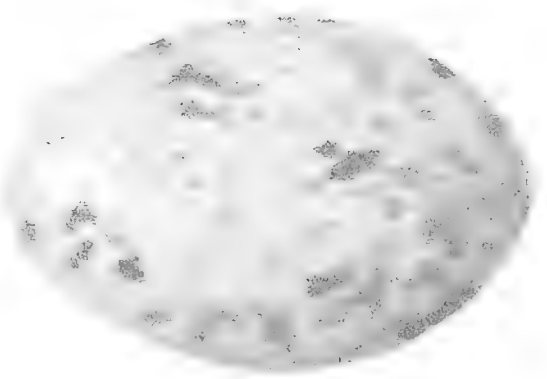


Fig. 1.

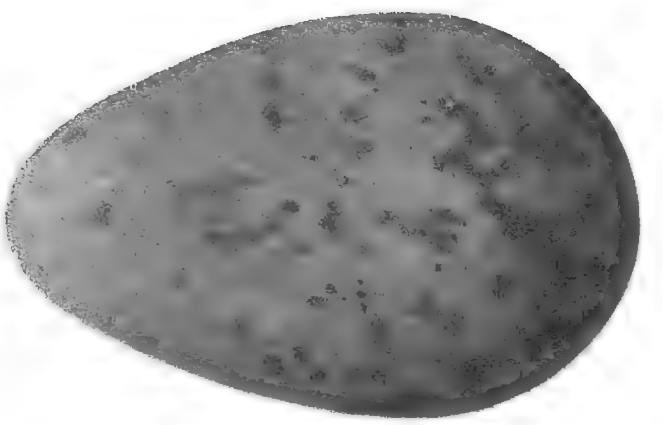


Fig. 2.

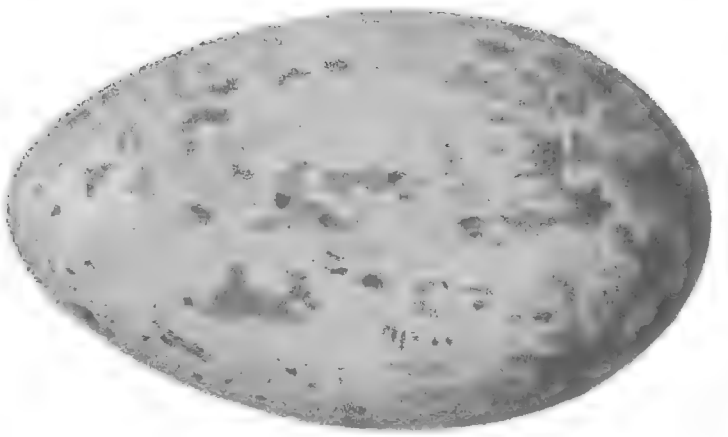
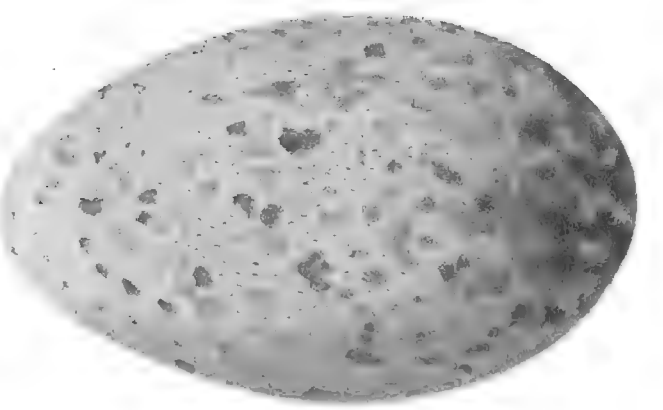


Fig. 3.



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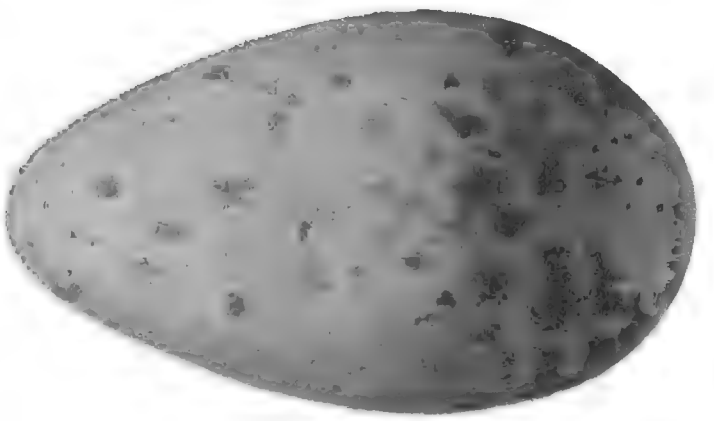

Fig. 5.

Fig. 6.

EGGS:

fig. 1, *Anthropoides virgo.*
fig. 2, *Anthropoides paradisea.*
fig. 3, *Anthropoides carunculata.*
fig. 4, *Anthropoides leucauchen.*
fig. 5, *Anthropoides leucogeranus.*
fig. 6, *Balearica regulorum.*

INDEX.

Americana (Ardea), 17.
—— (Grus), 17, 21.
American Crane, 17.
americanus (Limnogeranus), 17.
Anthropoides carunculata, 45.
—— leucauchen, 49.
—— leucogeranus, 53.
—— paradisea, 41.
—— pavonina, 57.
—— regulorum, 61.
—— stanleyanus, 41.
—— virgo, 35, 36.
Antigone antigone, 25, 29.
—— australasiana, 33.
—— collaris, 25.
—— leucauchen, 49.
—— leucogeranus, 53.
—— monachus, 15.
—— montignesia, 11.
—— torquata, 25.
—— (Ardea), 25, 29.
—— (Grus), 25, 29, 49.
Ardea americana, 17.
—— antigone, 25, 29.
—— canadensis, 21.
—— carunculata, 45.
—— gigantea, 53.
—— grus, 1.
—— palearis, 45.
—— paradisea, 41.
—— pavonina, 57, 61.
—— virgo, 35.
—— (Grus) japonensis, 11.
—— (Grus) mexicana, 21.
Asiatic White Crane, 53.
australasiana (Antigone), 33.
—— (Grus), 33.
Australian Crane, 33.

Balearica* (Grus), 35.
—— chrysopelargus, 61.
—— gibbericeps, 61.
—— gibberifrons, 61.
—— pavonina, 57, 61.
—— regulorum, 61.
Balearic Crane, 57.
Black-necked Crane, 9.
Brown and Ash-coloured Crane, 21.
Brown Crane, 21.
Bugeranus carunculatus, 45.

Caffra (Grus), 41.
canadensis (Ardea), 21.
—— (Grus), 21.
—— β. mexicana (Grus), 22.
Canadian Crane, 21.
canorus (Grus), 2.
Cape Crowned Crane, 61.
capensis (Grus), 41.
—— (Tetrapteryx), 41.
carunculata (Anthropoides), 45.
—— (Ardea), 45.
—— (Grus), 45.
—— (Laomedontia), 45.
carunculatus (Bugeranus), 45.
chrysopelargus (Balearica), 61.
cinerea (Grus), 1, 22.
—— β. cineracea (Grus), 2.
—— longirostris (Grus), 21.
clamator (Grus), 17.
collaris (Antigone), 25.
—— (Grus), 11, 25.
Common Crane, 1.
communis (Grus), 1.
—— var. orientalis (Grus), 2.
Crane, American, 17.
—— Asiatic White, 53.
—— Australian, 33.
—— Balearic, 57.
—— Black-necked, 9.
—— Brown, 21.
—— Brown and Ash-coloured, 21.
—— Canadian, 21.
—— Cape Crowned, 61.
—— Common, 1.
—— Crowned, 57.
—— Crowned African, 57, 61.
—— Demoiselle, 35.
—— Eastern Sarus, 29.
—— Greater Indian, 29.
Crane, Hooded, 15.
—— Hooping, 17.
—— Indian, 25, 29.
—— Japan, 11.
—— Mantchurian, 11.
—— Numidian, 35.
—— Sandhill, 22.
—— Sarus, 25.
—— Stanley, 41.
—— The, 1.
—— Wattled, 45.
—— White, 53.
—— White-collared, 25.
—— White-necked, 49.
—— Whooping, 17.
Crowned African Crane, 57, 61.
—— Crane, 57.
—— Heron, 57.

Demoiselle Crane, 35.
—— Heron, 35.
—— of Numidia, 35.
—— de Numidie, La, 35.

Eastern Sarus Crane, 29.

Fraterculus (Grus), 21.
fusca (Grus), 21.

Geranarchus pavonina, 57.
Geranus paradisea, 41.
gibbericeps (Balearica), 61.
gibberifrons (Balearica), 61.
gigantea (Ardea), 53.
—— (Grus), 53.
giganteus (Leucogeranus), 53.
Greater Indian Crane, 29.
Grue La, 1.
—— d'Amérique, La, 17.
—— de la Baye de Hudson, La, 21.
—— Blanche, La, 17.
—— brune, La, 21.
—— à collier, La, 25.
—— des Indes Orientales, La, 29.
—— du Japon, La, 11.

*) Read p. 35: *Vipio* Pliny, H. N. lib. X, cap. 49; *Grus balearica*, Pliny, H. N. lib. XI, cap. 37.

Grue de Mexique, La, 21.
—— de Numidie, La, 35.
Grus sp., 49.
—— americana, 17, 21.
—— antigone, 25, 29, 49.
—— australasiana, 33.
—— balearica, 35, 57.
—— caffra, 41.
—— canadensis, 21.
—— —— β. mexicana, 22.
—— canorus, 2.
—— capensis, 41.
—— carunculata, 45.
—— cinerea, 1, 2, 22.
—— —— β. cineracea, 2.
—— —— longirostris, 21.
—— clamator, 17.
—— collaris, 11, 25.
—— communis, 1.
—— —— var. orientalis, 2.
—— fraterculus, 21.
—— fusca, 21.
—— gigantea, 53.
—— grus, 2.
—— —— orientalis, 2.
—— hoyanus, 17.
—— japonensis, 11.
—— leucauchen, 11, 49.
—— leucogeranus, 11, 53.
—— lilfordi, 2.
—— longirostris, 21.
—— mexicana, 21.
—— monachus, 15.
—— montignesia, 11.
—— nigricollis, 9.
—— nostras, 2.
—— orientalis, 25.
—— ornata, 36.
—— pavonina, 57, 61.
—— polii, 53.
—— poliophæa, 21.
—— pratensis, 21.
—— regulorum, 61.
—— schlegelii, 22.
—— stanleyana, 41.
—— struthio, 17.
—— torquata, 25.
—— vipio, 15, 49.
—— virgo, 35, 36.
—— viridirostris, 11.
—— vulgaris, 2.
—— (Anthropoides) virgo, 35.
—— (Antigone) sharpii, 29.
—— (Ardea), 1.
grus (Grus), 2.
—— (Megalornis), 2.
—— orientalis (Grus), 2.

Heron, Crowned, 57.
—— Demoiselle, 35.
—— Wattled, 45.
Hooded Crane, 15.
Hooping Crane, 17.
hoyanus (Grus), 17.

Indian Crane, 25, 29.
—— Crane (Greater), 29.

Japan Crane, 11.
japonensis (Ardea), 11.
—— (Grus), 11.

Kroonvogel, 57.

Laomedontia carunculata, 45.
leucauchen (Anthropoides), 49.
—— (Antigone), 49.
—— (Grus), 11, 49.
—— (Pseudogeranus); 49.
Leucogeranus giganteus, 53.
leucogeranus (Anthropoides), 53.
—— (Antigone), 53.
—— (Grus), 11, 53.
—— (Sarcogeranus), 53.
lilfordi (Grus), 2.
Limnogeranus americanus, 17.
longirostris (Grus), 21.

Mantchurian Crane, 11.
Megalornis grus, 2.
mexicana (Ardea), 21.
—— (Grus), 21.
monachus (Antigone), 15.
—— (Grus), 15.
montignesia (Antigone), 11.
—— (Grus), 11.

Native companion, The, 33.
nigricollis (Grus), 9.
nostras (Grus), 2.
Numidia, The Demoiselle of, 35.
Numidian Crane, 35.

Oiseau Royal, L', 57.
—— Royal mâle, L', 61.
orientalis (Grus), 25.
ornata (Grus), 36.

Palearis (Ardea), 45.
paradisea (Anthropoides), 41.
—— (Ardea), 41.
—— (Geranus), 41.
—— (Scops), 41.
—— (Tetrapteryx), 41.
pavonina (Balearica), 57, 61.
Philorchemon virgo, 35.
polii (Grus), 53.
poliophæa (Grus), 21.
pratensis (Grus), 21.
Pseudogeranus leucauchen, 49.

Regulorum (Anthropoides), 61.
—— (Balearica), 61.
—— (Grus), 61.

Sandhill Crane, 22.
Sarcogeranus leucogeranus, 53.
Sarus Crane, 25.
—— —— Eastern, 29.
schlegelii (Grus), 22.
Scops paradisea, 41.
—— vipio, 49.
—— virgo, 35.
sharpii (Grus), 29.
stanleyana (Grus), 41.
stanleyanus (Anthropoides), 41.
Stanley Crane, 41.
struthio (Grus), 17.

Tetrapteryx capensis, 41.
—— paradisea, 41.
torquata (Antigone), 25.
—— (Grus), 25.

Vipio, 35.
vipio (Grus), 15, 49.
—— (Scops), 49.
virgo (Anthropoides), 35, 36.
—— (Ardea), 35,
—— (Grus), 35, 36.
—— (Philorchemon), 35.
—— (Scops), 35.
viridirostris (Grus), 11.
vulgaris (Grus), 2.

Wattled Crane, 45.
—— Heron, 45.
White-collared Crane, 25.
White Crane, 53.
White-necked Crane, 49.
Whooping Crane, 17.

LIST OF THE PLATES.

I. THE COMMON CRANE. *Grus communis.*
II. THE BLACK-NECKED CRANE. *Grus nigricollis.*
III. THE MANTCHURIAN CRANE, adult & chick. *Grus japonensis.*
IV. THE HOODED CRANE. *Grus monachus.*
V. THE AMERICAN CRANE. *Grus americana.*
VI. THE CANADIAN CRANE. *Grus canadensis.*
VII. THE SARUS CRANE. *Grus collaris.*
VIIa. THE SARUS CRANE, immature. *Grus collaris.*
VIII. THE EASTERN SARUS CRANE. *Grus antigone.*
IX. THE AUSTRALIAN CRANE. *Grus australasiana.*
X. THE DEMOISELLE CRANE. *Anthropoides virgo.*
Xa. THE DEMOISELLE CRANE, chick. *Anthropoides virgo.*
XI. THE STANLEY CRANE. *Anthropoides paradisea.*
XIa. THE STANLEY CRANE, immature. *Anthropoides paradisea.*
XII. THE WATTLED CRANE. *Anthropoides carunculata.*
XIII. THE WHITE-NECKED CRANE, adults & chick. *Anthropoides leucauchen.*
XIV. THE ASIATIC WHITE CRANE. *Anthropoides leucogeranus.*
XV. THE BALEARIC CRANE. *Balearica pavonina.*
XVa. THE BALEARIC CRANE, immature & chick. *Balearica pavonina.*
XVI. THE CAPE CROWNED CRANE. *Balearica regulorum.*
XVII. EGGS:
fig. 1, *Grus communis.*
fig. 2, *Grus japonensis.*
fig. 3, *Grus americana.*
fig. 4, *Grus canadensis.*
fig. 5, *Grus antigone.*
fig. 6, *Grus australasiana.*
XVIII. EGGS:
fig. 1, *Anthropoides virgo.*
fig. 2, *Anthropoides paradisea.*
fig. 3, *Anthropoides carunculata.*
fig. 4, *Anthropoides leucauchen.*
fig. 5, *Anthropoides leucogeranus.*
fig. 6, *Balearica regulorum.*

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Blaauw, Frans Ernst,
1860- ,
A monograph of the crane

1897.

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